



# Professional Measurement Technology

FOOD · PHARMACEUTICAL · LABORATORY · MEDICAL · INDUSTRIAL

## New Products



SL 1220 Complete Validation Set  
see page 44



AL 3310  
see page 47



SL 1200 Routine Control Set  
see page 51



TFN 520-EX Type K Thermometer  
see page 93



TFN 530-EX Type K Thermometer  
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PHT 830 pH Meter  
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CT 830 Conductivity Meter  
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RM 100 Room climate monitor  
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TPN 100-EX  
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AT 830 pH K Binder  
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TPN 110-EX  
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AT 830 pH G Binder  
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TPN 120-EX  
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AT 830 pH E Binder  
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TPN 140-EX  
see page 94



AT 830 C K Binder  
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TPN 600-EX  
see page 95



Interface cable for PHT 830 and CT 830  
see page 149



# A whole heartedly welcome to the world of measurements at ebro

ebro Electronic offers a huge range of professional measurement devices for the areas of food, medical, pharmaceutical and industrial applications.

## Measuring, recording, evaluating with ebro

Founded in 1968 ebro Electronic has specialized in designing and manufacturing top of the range measuring devices such as handheld instruments, thermometers and data loggers. If you are looking for equipment including software to measure temperature, humidity, pH-values, oil quality, pressure or Brix then you are here at the right place with Ebro Electronic as your partner. From purely measuring to monitoring and eventually evaluating we offer quality products and solutions bespoke to your individual demands.

## Products of highest quality for highest demands

All vital areas for processing or manufacturing food products, medical devices, pharmaceuticals, etc. are governed, by strictest regulations laid down in national or international guidelines, rules or law to ensure proper documentation in all stages. Ebro Electronic offers custom-made solutions to ease your workload and allows you excellent monitoring including optimized analysis and documentation in paper or electronic fashion. Our product portfolio will give you the assurance that you work with quality equipment ranging from the easiest, very reliable thermometer to the most sensitive sensors used in data loggers.

## ebro means service and customer satisfaction

Our support team is here to help you with sound knowledge and advice. We at ebro see us not only as manufacturer and designer, but also as service provider that works with you hand in hand, from quotation and purchasing, to getting the best results with our measurement technology.

Together with you we help you to find the best solution for your requirements, but we offer additionally:

- Calibration service
- Loan equipment
- Repairs
- Maintenance
- Trainings
- Downloads of software, catalog, brochures, etc.

Please take time and look at our range of products to convince yourself. Using our measurement devices gives you the freedom to work efficiently while saving valuable resources.

ebro Electronic is a business unit under the umbrella of the WTW GmbH. Since 2011 the WTW GmbH is part of the Xylem group, a leading provider in global solutions for water technology.

[www.ebro.com](http://www.ebro.com)

[www.WTW.com](http://www.WTW.com)

[www.Xylemanalytics.com](http://www.Xylemanalytics.com)

[www.Xyleminc.com](http://www.Xyleminc.com)

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All ebro measurement devices come with a factory calibration certificate, except for the TDC thermometers, the GFX contact thermometers, the PHX 800 pH tester, the SSX 210 and the humidity logger EBI 300 TH. For the EBI 330 data loggers, a batch calibration certificate is available on request.



#### FOOD

Products labeled with this icon meet the standards DIN EN 12830 (data loggers), DIN EN 13485 (handhelds) and/or DIN EN 13846 (data loggers and handhelds).



PHARMA-  
CEUTICAL



LABORATORY



MEDICAL



INDUSTRIAL



COOL  
CHAIN



#### Winlog.mobile

For users of the software Winlog.web ebro has designed an App called Winlog.mobile - free of charge - to monitor the performance via smartphone.



ROOM  
CLIMATE

# Data Loggers

ebro offers data loggers for many different applications:



## Validation

### Description:

- High precision temperature, pressure and humidity data loggers for thermal sterilization and validation processes
- Broad set of probe types and configurations
- Wireless data loggers for real time monitoring
- Data loggers for tight spaces

### Applications:

- Validation of steam sterilizers, autoclaves, at canning etc.
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- F-value and  $A_0$  value calculation
- Process monitoring

## Routine Control

### Description:

- Precision temperature and pressure data loggers for monitoring of sterilization and thermal processes
- Electronic Bowie Dick Test according to ISO 17665 and EN 285/EN 13060
- Data loggers for tight spaces
- Data loggers for regular process controls

### Applications:

- Routine control of steam sterilizers and autoclaves
- Routine control of washer-disinfectors and washer-disinfectors for endoscopes
- Routine control at canning etc.





## Cold chain and process monitoring

### Description:

- Standard temperature and humidity data loggers with automatic PDF generation
- Wireless temperature and humidity monitoring system
- Multi-channel thermocouple temperature data logger

### Applications:

- Room monitoring and mapping
- Transport and storage monitoring
- Clean room and freezer monitoring

# Validation Data



## EBI 10 High Precision Wireless Data Loggers

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### Description:

- High temperature accuracy up to 0.1 °C
- Extended temperature measurement range from -85 °C up to 400 °C
- Pressure measurement up to 4000 mbar
- Humidity measurement from 0% rH to 100% rH
- Radio communication possible for real-time monitoring

i

During 2016 many data logger of the EBI 10 series will be available as a version with ATEX certification.

Feel free to contact us.

### Applications:

- Wireless validation of processes in sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
  - F-value and  $A_0$ -value calculation
  - Process monitoring
- 





# Loggers



EBI 10 for EX applications  
High Precision Wireless Data  
Loggers



Interfaces

---

## Description:

- ATEX Certified EX- II1G ia IIC T4 Ga X for ambient temperature from -40 up to +85°C
- High temperature accuracy up to 0.1 °C
- Extended temperature measurement range from 85 °C up to 400 °C
- Pressure measurement up to 4000 mbar
- High precision pressure measurement with accuracy up to 0.25 mbar
- Humidity measurement from 0% rH to 100% rH
- Radio communication possible for realtime monitoring

## Applications:

- Validation of processes in steam sterilizers, low temperature sterilizers (LTSF, H<sub>2</sub>O<sub>2</sub> and EtO), washer-disinfectors and washer-disinfectors for endoscopes and Bedpan washers
- F-value and A<sub>0</sub>-value calculation
- Process monitoring

---

## Description:

- Read out simultaneous up to four Logger
- Radio communication possible for real-time monitoring
- Compatible with different types of logger
- Visual status control

## Applications:

- Programming and read out of data logger
- Control of logger parameter
- Service of logger e.g. battery exchange

# EBI 10 High Precision Wireless Data Loggers

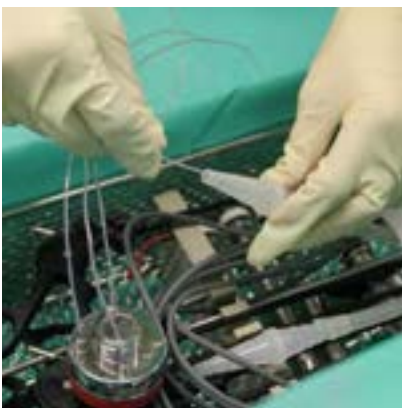
## The Perfect Solution for Your Applications

To fit each of your specific processes, ebro offers a wide variety of EBI 10 temperature, pressure and humidity data loggers in many different configurations. For example you have the choice of internal sensors, rigid and bendable metal probes, fully flexible cable probes, Luer-lock or tube connection.

The user can follow the validation process in real time on his PC screen and can stop a faulty process immediately, if necessary, saving much time and effort during process monitoring or validation.

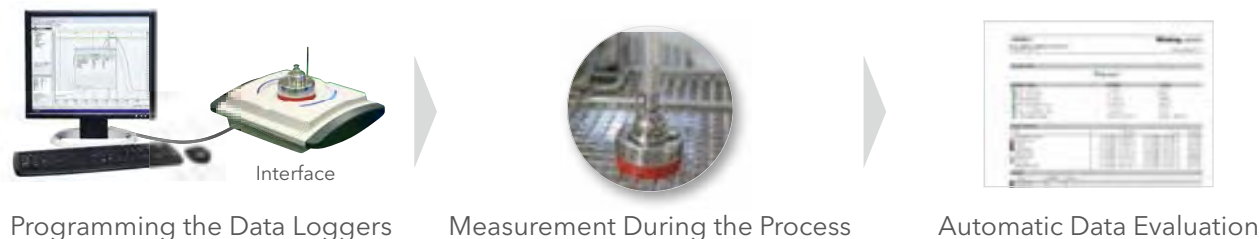
The wireless real time monitoring of hot processes up to +400 °C is suitable for many medical, pharmaceutical, laboratory and industrial applications:

- Wireless validation of processes in sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- F-value and  $A_0$ -value calculation
- Process monitoring



Source: Film "Reprocessing of Medical Devices" a film by the Central Service Supply Department (CSSD) of the Diakonia Clinic in Schwabisch-Hall, Germany

Source: Film "Reprocessing of Medical Devices" a film by the Central Service Supply Department (CSSD) of the Diakonia Clinic in Schwabisch-Hall, Germany



## EBI 10 Wireless Temperature Data Loggers

### General technical specifications: valid for all EBI 10 temperature data loggers\*

Operating temperature: logger	-85 °C ... +150 °C (-121 °F ... +302 °F)
Operating temperature: radio operation	-30 °C ... +150 °C (-22 °F ... +302 °F)
Operating temperature: EX application (ATEX)	-40 °C ... +85 °C
Temperature accuracy	±0.5 °C (-85 °C ... -40 °C) ±0.2 °C (-40 °C ... 0 °C) ±0.1 °C (0 °C ... +140 °C) ±0.2 °C (+140 °C ... +250 °C) ±0.5 °C (+250 °C ... +400 °C)
Temperature resolution	0.01 °C
Memory	Max. 100,000 measurement values (total)
Sensor: Temperature	Pt 1000
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Start / stop measurement</li> <li>• Measure upon start temperature</li> <li>• Measure until end of memory</li> <li>• Start immediately until end of memory</li> </ul>
Sampling rate	250 msec ... 24 h
Data transmission	Wireless, 2,4 GHz/IEEE 802.15.4
Storage temperature	-20 °C ... +125 °C (-4 °F ... +257 °F)
Battery	Lithium button cell, 3.6 V, replaceable
Dimensions (Ø x H)	48 mm x 24 mm**
Weight	Approximately 70 g **
Housing material	Stainless steel (V4A) / PEEK
Protection class	IP 68

\* Please find the exact technical data of each EBI 10 temperature data logger type on the next pages.

\*\* Dimensions and weight just refer to the EBI 10 housing

## EBI 10-T100 Temperature Data Logger

### Internal sensor



#### Technical Data

Measurement range	-85 °C ... +150 °C (-121 °F ... +302 °F)
Data memory	100,000 measurement values

- 1 internal temperature sensor

Type	Description	Part No.
EBI 10-T100	Integrated temperature sensor	1340-6100

## EBI 10-T21x Temperature Data Logger

### Rigid metal probe



#### Technical Data

Measurement range	-85 °C ... +150 °C (-121 °F ... +302 °F)
Data memory	100,000 measurement values

- 1 external temperature sensor, radial, Ø 3 mm

Type	Description	Part No.
EBI 10-T210	L = 50 mm	1340-6102
EBI 10-T211	L = 75 mm	1340-6103

## EBI 10-T23x Temperature Data Logger

### Rigid metal probe



#### Technical Data

Measurement range	-85 °C ... +150 °C (-121 °F ... +302 °F)
Data memory	100,000 measurement values

- 1 external temperature sensor, axial, Ø 3 mm

Type	Description	Part No.
EBI 10-T230	L = 50 mm	1340-6106
EBI 10-T231	L = 75 mm	1340-6107
EBI 10-T232	L = 100 mm	1340-6108
EBI 10-T233	L = 150 mm	1340-6109

## EBI 10-T22x Temperature Data Logger Bendable metal probe



Please find suitable thermal isolation boxes for use from +150 °C (+302 °F) on page 20.



### Technical Data

Measurement range	-85 °C ... +400 °C (-121 °F ... +752 °F)
Data memory	100,000 measurement values

- 1 external temperature sensor, radial, bendable, Ø 1.5 mm

Type	Description	Part No.
EBI 10-T220	L = 250 mm	1340-6104
EBI 10-T221	L = 500 mm	1340-6105

## EBI 10-T24x Temperature Data Logger Bendable metal probe



For a suitable silicone protection box, please see page 20.



### Technical Data

Measurement range	-85 °C ... +400 °C (-121 °F ... +752 °F)
Data memory	100,000 measurement values

- 1 external temperature sensor, axial, bendable, Ø 1.5 mm

Type	Description	Part No.
EBI 10-T240	L = 250 mm	1340-6111
EBI 10-T241	L = 500 mm	1340-6112

## EBI 10-T441 Temperature Data Logger Bendable metal probes



For a suitable silicone protection box, please see page 20.



### Technical Data

Measurement range	-85 °C ... +400 °C (-121 °F ... +752 °F)
Data memory	2 x 50,000 measurement values

- 2 external temperature sensors, axial, bendable, Ø 1.5 mm

Type	Description	Part No.
EBI 10-T441	L = 500 mm	1340-6129

## EBI 10-T421 Temperature Data Logger

### Bendable metal probes



- 2 external temperature sensors, radial, bendable, Ø 1.5 mm

#### Technical Data

Measurement range	-85 °C ... +400 °C (-121 °F ... +752 °F)
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T421	L = 500 mm	1340-6130



Please find suitable thermal isolation boxes for use from +150 °C (+302 °F) on page 19.

## EBI 10-T471 Temperature Data Logger

### Flexible cable probes



- 2 external temperature sensors, axial, flexible, Ø 1.2 mm

#### Technical Data

Measurement range	-20 °C ... +150 °C (-4 °F ... +302 °F)
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T471	L = 1200 mm	1340-6144



## EBI 10-T490 Temperature Data Logger

### Flexible cable probes



- 2 external temperature sensors, radial, flexible, Ø 1.2 mm

#### Technical Data

Measurement range	-20 °C ... +150 °C (-4 °F ... +302 °F)
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T490	L = 600 mm	1340-6134



## EBI 10-T671 Temperature Data Logger Flexible cable probes



- 4 external temperature sensors, axial, flexible, Ø 1.2 mm

### Technical Data

Measurement range	-20 °C ... +150 °C (-4 °F ... +302 °F)
Data memory	4 x 25,000 measurement values

Type	Description	Part No.
EBI 10-T671	L = 1200 mm	1340-6145

## EBI 10-T690 Temperature Data Logger Flexible cable probes



- 4 external temperature sensors, radial, flexible, Ø 1.2 mm

### Technical Data

Measurement range	-20 °C ... +150 °C (-4 °F ... +302 °F)
Data memory	4 x 25,000 measurement values

Type	Description	Part No.
EBI 10-T690	L = 600 mm	1340-6135



## EBI 10 Wireless Temperature / Pressure Data Loggers

### General technical specifications: valid for all EBI 10 temperature / pressure data loggers

Operating temperature: radio operation	0 °C ... +150 °C (+32 °F ... +302 °F)
Operating temperature: EX application (ATEX)	0 °C ... +85 °C
Accuracy: Temperature	±0.1 °C (0 °C ... +140 °C) ±0.2 °C (+140 °C ... +150 °C)
Resolution: Temperature	0.01 °C
Accuracy: Pressure	±10 mbar (50 mbar ... 150 mbar) ±10 mbar (2050 mbar ... 2250 mbar) ±10 mbar (3000 mbar ... 3250 mbar) ±15 mbar (for the remaining measurement range)
Resolution: Pressure	1 mbar
Memory	Max. 100,000 measurements (total)
Sensor: Temperature	Pt 1000
Sensor: Pressure	Piezo resistive pressure sensor (temperature compensated)
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Start / stop measurement</li> <li>• Measure upon start temperature</li> <li>• Measure until end of memory</li> <li>• Start immediately until end of memory</li> </ul>
Sampling rate	250 msec ... 24 h
Data transmission	Wireless, 2,4 GHz/IEEE 802.15.4
Storage temperature	0 °C ... +125 °C (+32 °F ... +257 °F)
Battery	Lithium button cell, 3.6 V, replaceable
Dimensions (Ø x H)	48 mm x 24 mm**
Weight	Approximately 70 g **
Housing material	Stainless steel (V4A) / PEEK
Protection class	IP 68 / NEMA 6P

\* Please find the exact technical data of each EBI 10 temperature/pressure data logger type on the next pages.

\*\* Dimensions and weight just refer to the EBI 10 housing

### EBI 10-TP230 Temperature / Pressure Data Logger Rigid metal probe



- 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,400 measurement values

Type	Description	Part No.
EBI 10-TP230	L = 40 mm	1340-6154



## EBI 10-TP221 Temperature/Pressure Data Logger

### Bendable metal probe



For a suitable silicone protection box, please see page 20.

- 1 external temperature sensor, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,400 measurement values

Type	Description	Part No.
EBI 10-TP221	L = 500 mm	1340-6153

## EBI 10-TP321 Temperature/Pressure Data Logger

### Bendable metal probes



For a suitable silicone protection box, please see page 20.

- 2 external temperature sensors, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	3 x 25,000 measurement values

Type	Description	Part No.
EBI 10-TP321	L = 500 mm	1340-6161

## EBI 10-TP322 Temperature/Pressure Data Logger

### Bendable metal probes and Luer-Lock connection



- 2 external temperature sensors, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	3 x 25,000 measurement values

Type	Description	Part No.
EBI 10-TP322	L = 500 mm	1340-6164

## EBI 10-TP421 Temperature/Pressure Data Logger

### Bendable metal probes



For a suitable silicone protection box, please see page 20.

- 3 external temperature sensors, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP421	L = 500 mm	1340-6162

## EBI 10-TP450/452 Temperature/Pressure Data Logger

### Flexible cable probes



- 3 external temperature sensors, axial, flexible, Ø 1.2 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP450	L = 600 mm	1340-6142
EBI 10-TP452	L = 1200 mm	1340-6146

## EBI 10-TP460 Temperature/Pressure Data Logger

### Flexible cable probes



- 3 external temperature sensors, radial, flexible, Ø 1.2 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP460	L = 600 mm	1340-6148

## EBI 10-TP231 Temperature/Pressure Data Logger

### Luer-Lock connection



- 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... +4000 mbar
Data memory	2 x 33,400 measurement values

Type	Description	Part No.
EBI 10-TP231	L = 40 mm	1340-6155

## EBI 10-TP111 Temperature/Pressure Data Logger

### Luer-Lock connection



- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,400 measurement values

Type	Description	Part No.
EBI 10-TP111	Luer-Lock connection	1340-6156

## EBI 10-TP451/453 Temperature/Pressure Data Logger

### Luer-Lock connection



- 3 external temperature sensors, axial, flexible, Ø 1.2 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP451	L = 600 mm	1340-6143
EBI 10-TP453	L = 1200 mm	1340-6147

## EBI 10-TP200 Temperature/Pressure Data Logger

Tube connection and M10x1 internal thread



- 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,400 measurement values

Type	Description	Part No.
EBI 10-TP200	Tube connection	1340-6152

## EBI 10 Temperature/Pressure Data Logger for Low-temperature Sterilization Processes

### EBI 10-TPX9X Precision Pressure Logger

High precision pressure measurement down to 0.1 mbar



EBI 10-TP190-EX

### Technical Data

Measurement range: Pressure	0.1 to 1050 mbar
Measurement range: Temperature	0 °C ... +85 °C
Accuracy: Pressure	0.25 mbar (0.1 to 50 mbar) ±5 % of measured value (50 to 100mbar) 1 % FS (100 to 1050 mbar)
Accuracy: Temperature	±0.1 °C (0 °C to +85 °C)
Resolution: Pressure	0.1 mbar
Resolution: Temperature	0.01°C
Data memory	50,000 (TP190) or 33,400 (TP291) measurement values
Sampling rate	250 ms to 24 h
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement immediately</li> <li>• Measure immediately until end of memory</li> <li>• Start / stop measurement</li> </ul>
Sensor	Pt 1000, piezoresistive pressure sensor
Interface	Wireless 2.4 GHz / IEEE 802.15.4
Operating temperatur	0 to + 85 °C
Battery	Lithium cell 3,6 V replaceable
Dimension (D x H)	46 x 35 mm
Housing material	Stainless steel (V4A), PEEK
Protection class	IP68/NEMA 6P

- 1 internal or 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Type	Description	Part No.
EBI 10-TP190-EX	Internal	1340-6165-EX
EBI 10-TP291-EX	L = 40 mm	1340-6166-EX

## EBI 10 Wireless Temperature / Humidity Data Logger

### EBI 10-TH100 Temperature/Humidity Data Logger in standard atmospheres



Filter caps for the protection of the humidity probe available; see page 142.

- 1 external temperature channel (Pt 1000)
- 1 humidity channel (capacitive)
- combined sensor replaceable

#### Technical Data

Temperature measurement range	-40 °C ... +85 °C (-40 °F ... +185 °F)
Humidity measurement range	0 % rH... 100 % rH
Temperature accuracy	0.1 °C
Humidity accuracy	± 2 % rH, non-condensing at 25 °C (10 % rH ... 90 % rH)
Temperature resolution	0.01 °C
Humidity resolution	0.1 % rH
Data memory	100,000 measurements (50,000 per channels)
Measurement channels	1 external temperature channel (Pt 1000), 1 humidity channel (capacitive); combined sensor replaceable
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Start / stop measurement</li> <li>• Start immediately until end of memory</li> </ul>
Storage temperature	-20 °C ... +70 °C (-4 °F ... +158 °F)
Battery	Lithium cell 3,6 V replaceable
Dimensions (l x w x h)	46 x 48 x 70 mm
Housing material	Stainless steel (V4A), PEEK
Protection class	IP 52

Type	Description	Part No.
EBI 10-TH100	Temperature/humidity data logger	1340-6171
AH 300	Stainless steel sintered filter for EBI 10-TH100	1340-5625
AL 175	Sensor EBI10-TH100	1341-6145

## Accessories, Interfaces and Software for EBI 10

Please find complete validation sets from page 43.

Holding clamps to hold the flexible cable probes of the EBI 10 wireless data loggers. Available in the SL 3000 data logger set (see page 45) or on request.



#### Battery changing set AL 103

for EBI 10 and EBI 100  
Consisting of 3 batteries, 3 O-rings with grease, cross slot screw driver, silicone grip and silicone protection box cover for battery exchange.

#### AL 104 Battery Set

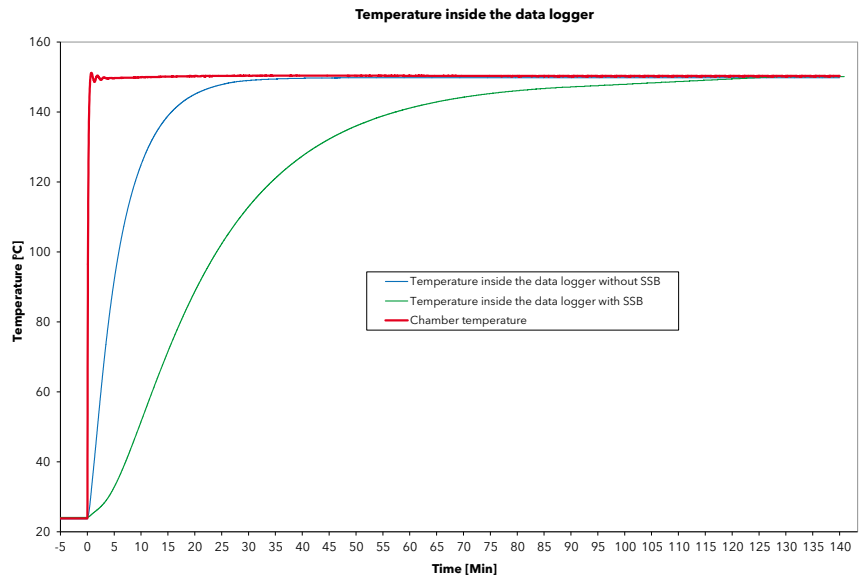
for EBI 10 and EBI 100  
Consisting of 3 batteries and 4 O-rings with grease.



**Silicone protection box AL 100**  
for e.g. EBI 10-T24x and EBI 10-T441

- Protects temperature logger against heat peaks
- Protects temperature logger against mechanical damage
- Extends the life of temperature data loggers

Ø 78mm, Height: 44mm



**Silicone protection box AL 101**  
for e.g. EBI 10-TP221, EBI 10-TP321 and EBI 10-TP421

- Protects temperature / pressure logger against heat peaks
- Protects temperature / pressure logger against mechanical damage
- Extends the life of pressure/temperature data loggers

Ø 78mm, Height: 50mm



**Silicone protection box AL 106**  
for e.g. EBI 10-T24x, EBI 10-T441 and EBI 10-T421, EBI 10 T22x

- Protects temperature logger against heat peaks
- Protects temperature / pressure logger against mechanical damage
- Extends the life of temperature data loggers

Ø 78mm, Height: 44mm

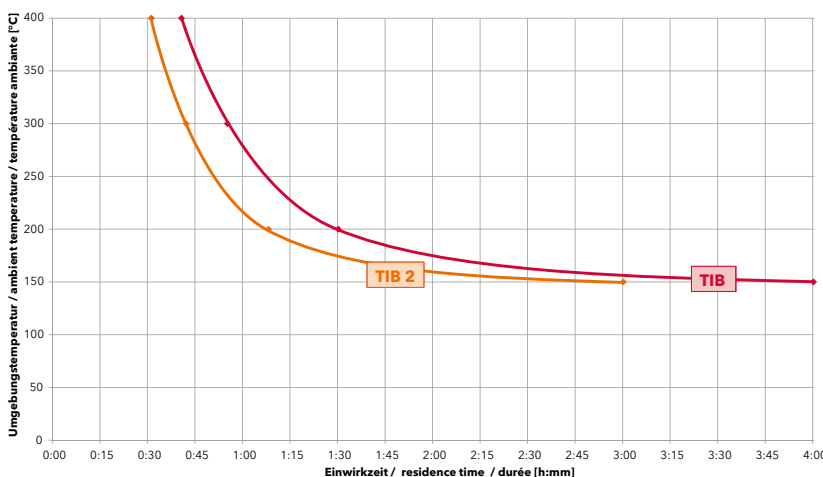


**Silicone protection box AL 107**  
for e.g. EBI 10-T24x, EBI 10-T441, EBI 10-T670 and EBI 10-T671

- Protects temperature logger against heat peaks
- Protects temperature / pressure logger against mechanical damage
- Extends the life of temperature data loggers

Ø 78mm, Height: 44mm

**Grenzbedingung / limit condition / condition aux limites TIB / TIB 2**



**Thermal isolation boxes EBI TIB and EBI TIB 2**

- for EBI 10-T22x and EBI 10-T421
- Usable from +150 °C ... +400 °C
- Thermal protection of data loggers
- Stainless steel
- EBI TIB: 160 x 160 x 82 mm
- EBI TIB 2: 160 x 160 x 60 mm





**Set SI 1100**

for EBI 10, EBI 100 and EBI 11

- 2-port Interface IF 100
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- Includes antenna



**Set SI 1200**

for EBI 10 and EBI 100

- 4-port Interface IF 200
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- Includes antenna



**Set SI 2100**

for EBI 10, EBI 100 and EBI 11

- 2-port Interface IF 100
- Software Winlog.med
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- Includes antenna



**Set SI 2110**

for EBI 10 and EBI 100

- 4-port Interface IF 200
- Software Winlog.med
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- Includes antenna



**Set SI 2150**

for EBI 10, EBI 16 und EBI 100

- 1-port Interface IF 150
- Software Winlog.med
- USB connection
- Colored LEDs signaling programming, readout and incorrect development



**Set SI 3200**

for EBI 10 and EBI 100

- 4-port Interface IF 200
- Software Winlog.validation
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- Includes antenna



**AL 112**

for IF100 and IF 200

- Developed for real time monitoring
- AL 112 is a cable with 3 m length
- Antenna placement in the field of the door seal of a sterilizer or washer-disinfector
- Antenna steam-tight
- It is possible by a sealing to introduce it in the chamber

Type	Description	Part No.
SI 1100	Set: EBI IF 100 interface and Winlog.pro software	1340-6061
SI 1200	Set: EBI IF 200 interface and Winlog.pro software	1340-6062
SI 2100	Set: EBI IF 100 interface and Winlog.med software	1340-6064
SI 2110	Set: EBI IF 200 interface and Winlog.med software	1340-6095
SI 2150	Set: EBI IF 150 interface and Winlog.med software	1340-6193
SI 3200	Set: EBI IF 200 interface and Winlog.validation software	1340-6068
AL 100	Silicone protection box for EBI 10 temperature data loggers	1340-6020
AL 101	Silicone protection box for EBI 10 pressure data loggers	1340-6021
AL 102	Silicone protection box for EBI 10 temp. data loggers	1340-6022
AL 103	Battery change set for EBI 10 and EBI 100	1100-0117
AL 104	Battery set for EBI 10 and EBI 100	1100-0118
AL 106	Silicone protection box for EBI 10 temp. data loggers	1340-6023
AL 107	Silicone protection box for EBI 10 temp. data loggers	1340-6024
AL 112	Antenna Steam sterilizer	1340-6007
EBI TIB	Thermal isolation box, 160 x 160 x 82 mm	1340-1894
EBI TIB 2	Thermal isolation box, 160 x 160 x 60 mm	1340-1892

# Data Loggers for



EBI 16  
Electronic Bowie Dick Test System

**Description:**

- Clear, reproducible measurement result
- High-resolution graphical cycle display
- Digital data recording and storage
- Easy to use and evaluate

**Applications:**

- Vacuum checks
- Steam penetration tests using an Electronic Bowie and Dick Test
- Comprehensive routine checks of steam sterilizers according to ISO 17665 and EN 285/EN 13060



EBI 100  
Precision Data Loggers

**Description:**

- Available in temperature and temperature/pressure versions with internal and external, flexible and rigid probes
- Temperature/pressure data loggers with various connection types

**Applications:**

- Routine control of sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- F-value and  $A_0$ -value calculation
- Process monitoring





# Routine Control



## Interfaces

---

### **Description:**

- Read out up to four Logger simultaneous
- Compatible with different types of logger
- Optic status control

### **Applications:**

- Programing and read out of data logger
  - Control of logger parameter
  - Service of logger e.g. battery exchange
-

## EBI 16 Electronic Bowie Dick Test System

Together with the evaluation software Winlog.med the new EBI 16 data logger forms an easy to use and very reliable electronic measurement system. With it a comprehensive routine control of steam sterilizers can be performed using an Electronic Bowie Dick Test according to EN ISO 11140-4. In addition to the review of the steam penetration, the relevant sterilization parameters are controlled.

### Bowie Dick Test

The EBI 16 delivers clear results during daily checks of the air evacuation test and steam penetration test according to ISO 17665, EN ISO 11140-4 and DIN EN 285.

### Early warning system

The EBI 16 provides early identification of possible failures in steam-sterilizers. Even the smallest quantities of residual air that doesn't lead to a failed Bowie Dick Test yet are detected.

### Vacuum check

The EBI 16 allows a reasonable vacuum check also for sterilizers without pressure display according to DIN EN 285.

### Verification of sterilization parameters

The EBI 16 checks the sterilization parameters such as compensation time, hold time, sterilization temperature and sterilization time at +134 °C (+273 °F) for 3 minutes according to DIN EN 285.

### Calculation of lethality ( $F_0$ )

The EBI 16 monitors deviations between cycles by calculating total quantity of energy expended during sterilization process which is displayed by the  $F_0$  value.



## EBI 16 Bowie Dick Test Data Logger according to EN 285 / ISO 17665



- **Reliable:** clear, reproducible measurement results
- **Accurate:** high-resolution graphical cycle display
- **Secure:** digital data recording and storage
- **Easy:** to use and evaluate

### Technical Data

Measurement range	Temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
	Pressure	1 to 4000 mbar
Accuracy	Temperature	± 0.1 °C
	Pressure	± 15 mbar
Resolution	Temperature	0.01 °C
	Pressure	1 mbar (100 Pa)
Data memory		6,750 measurement values
Sampling rate		1 sec
Measurement mode		Start / stop measurement
Sensor		Pt 1000, piezoresistive pressure sensor
Interface		Wireless 2.4 GHz / IEEE 802.15.4
Operating temperature		0 to + 150 °C
Protection class		IP68/NEMA 6P
Battery		Lithium cell 3,6 V replaceable
Battery lifetime		Up to 2 Years
Dimension (D x H)		90 x 150 mm
Housing material		Stainless steel (V4A), PEEK
Weight		Approx. 500 g (incl. battery)
Calibration		Factory calibration

Type	Description	Part No.
EBI 16	Electronic Bowie and Dick Test	1340-6197

## EBI 16 Bowie and Dick Test Sets

With the EBI 16 starter sets you can start your Electronic Bowie Dick Test immediately according to the norms EN 285/ISO 17665.

*Please find complete routine control sets on page 49.*

### SL 1520 set contains:

- Bowie Dick Test EBI 16
- Winlog.med software
- EBI IF 150 Interface
- Aluminum carrying case



**SL 1520 set**  
for steam sterilizers



**SL 1620 set**  
for steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes

### SL 1620 set contains:

- Bowie Dick Test EBI 16
- EBI 100-TP231 temperature/pressure data logger (see p. 31)
- Winlog.med software
- EBI IF 150 interface
- Aluminum carrying case

Type	Description	Part No.
SL 1520 set	EBI 16 set for steam sterilizers	1340-6198
SL 1620 set	EBI 16 set for steam sterilizers and washer-disinfectors	1340-6573

## EBI 100 Precision Data Loggers

With the EBI 100 data loggers, ebro offers reliable measurement devices for routine control according to German guidelines and ISO 15883.

The precision data loggers are available in different versions including temperature or temperature / pressure loggers with and without external probes. They record the temperature and pressure variation over time during the washer-disinfector or sterilizer process and can easily be read out on a computer using the Winlog.med software. This software will make the test evaluation easy, and automatically calculates the  $A_0$  value.

### Applications:

- Routine control of steam sterilizers
- Routine control of washer-disinfectors and washer-disinfectors for endoscopes





Integrated sensor



Rigid metal probe



Bendable metal probe



Luer-Lock connection



Tube connection

**General technical specifications: valid for all EBI 100 Data Loggers\***

Accuracy: Temperature	±0.3 °C
Resolution: Temperature	0.1 °C
Accuracy: Pressure (only pressure data loggers)	±20 mbar
Resolution: Pressure (only pressure data loggers)	1 mbar
Sensor: Temperature	Pt 1000, internal
Sensor: Pressure (only pressure data loggers)	Piezo resistive pressure sensor (temperature compensated)
Sampling rate	1 sec to 24 hours
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Measurement start / stop time</li> <li>• Measurement immediately until end of memory</li> <li>• Measurement from start time</li> </ul>
Operating temperature	<b>EBI 100-T100:</b> -40 °C ... +150 °C <b>EBI 100-T101:</b> -85 °C ... +85 °C
Storage temperature	-40 °C ... +70 °C
Battery	Lithium cell 3,6 V replaceable
Battery lifetime	Up to 2 years, depending on measurement interval and operating temperature <b>(EBI 100-T101: only 100 hours at -85 °C / -121 °F)</b>
Dimensions (L x W x H)	48 x 48 x 24 mm**
Weight	Approximately 70 g**
Housing material	Stainless steel (V4a), PEEK
Protection class	IP 68 (-30 °C ... +150 °C / -22 °F ... +302 °F)
Certificate	Factory calibration certificate

\* Please find the exact technical data of each EBI 100 logger type on the next pages.

\*\* Dimensions and weight just refer to the EBI 100 housing.

## EBI 100-T10x (Low) Temperature Data Logger

### Integrated sensor



EBI 100-T100

#### Technical Data

Measurement range	EBI 100-T100: -40 °C ... +150 °C (-40 °F ... +302 °F) EBI 100-T101: -85 °C ... +85 °C (-121 °F ... +185 °F)
Data memory	27,000 measurement values

- 1 internal temperature sensor, Pt 1000

Type	Description	Part No.
EBI 100-T100	Temperature Data Logger, 1-port, internal	1340-6500
EBI 100-T101	Low Temperature Data Logger, 1-port, internal	1340-6501

## EBI 100-T21x Temperature Data Logger

### Rigid metal probe



EBI 100-T210

#### Technical Data

Measurement range	-40 °C ... +150 °C (-40 °F ... +302 °F)
Data memory	27,000 measurement values

- 1 external temperature sensor, radial, pointed, Ø 3 mm

Type	Description	Part No.
EBI 100-T210	Temperature logger, 1-channel, L = 50 mm	1340-6502
EBI 100-T211	Temperature logger, 1-channel, L = 75 mm	1340-6503

## EBI 100-T23x Temperature Data Logger

### Rigid metal probe



EBI 100-T230

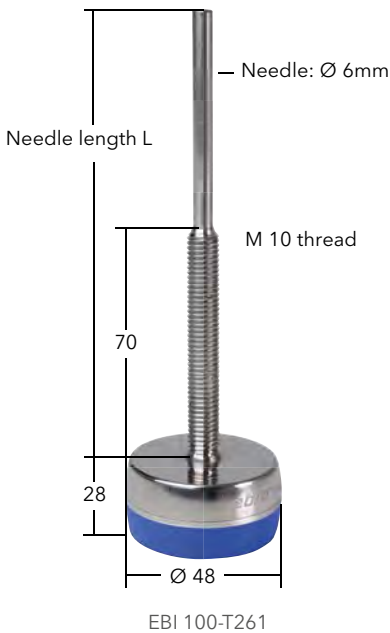
#### Technical Data

Measurement range	-40 °C ... +150 °C (-40 °F ... +302 °F)
Data memory	27,000 measurement values

- 1 external temperature sensor, axial, pointed, Ø 3 mm

Type	Description	Part No.
EBI 100-T230	Temperature logger, 1-channel, L = 50 mm	1340-6506
EBI 100-T231	Temperature logger, 1-channel, L = 75 mm	1340-6507
EBI 100-T232	Temperature logger, 1-channel, L = 100 mm	1340-6508
EBI 100-T233	Temperature logger, 1-channel, L = 150 mm	1340-6509

## EBI 100-T26x Bottle Logger Rigid metal probe



Please see page 33 for suitable bottle, can and glass adapters.



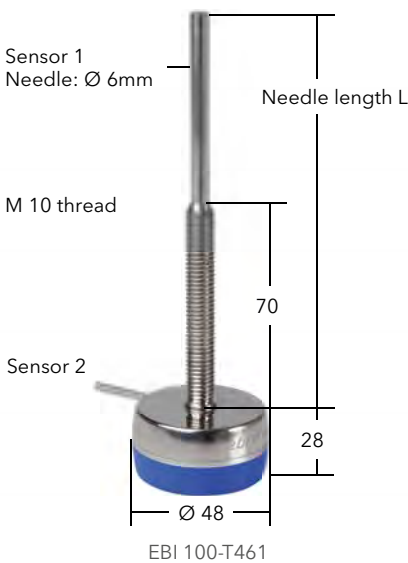
### Technical Data

Measurement range	-40 °C ... +150 °C (-40 °F ... +302 °F)
Data memory	27,000 measurement values

Type	Description	Part No.
EBI 100-T261	Bottle logger, 1-channel, L = 135 mm	1340-6518
EBI 100-T262	Bottle logger, 1-channel, L = 190 mm	1340-6519
EBI 100-T263	Bottle logger, 1-channel, L = 245 mm	1340-6520
EBI 100-T264	Bottle logger, 1-channel, L = 270 mm	1340-6521
EBI 100-T265	Bottle logger, 1-channel, L = 300 mm	1340-6522

- 1 external temperature sensor, axial, blunt, Ø 6 mm

## EBI 100-T46x Bottle Logger Rigid metal probes



Please see page 33 for suitable bottle, can and glass adapters.



### Technical Data

Measuring range	-40 °C ... +150 °C (-40 °F ... +302 °F)
Data memory	2 x 13,500 measurement values

Type	Description	Part No.
EBI 100-T461	Bottle logger, 2-channel, L = 135 mm	1340-6523
EBI 100-T462	Bottle logger, 2-channel, L = 190 mm	1340-6524
EBI 100-T463	Bottle logger, 2-channel, L = 245 mm	1340-6525
EBI 100-T464	Bottle logger, 2-channel, L = 270 mm	1340-6526
EBI 100-T465	Bottle logger, 2-channel, L = 300 mm	1340-6527

- 2 external temperature sensors, axial and radial, blunt, Ø 6 mm

## EBI 100-T221 Temperature Data Logger

### Bendable metal probe



- 1 external temperature sensor, radial, bendable, blunt, Ø 1.5 mm

#### Technical Data

Measurement range	-40 °C ... +150 °C (-40 °F ... +302 °F)
Data memory	27,000 measurement values

Type	Description	Part No.
EBI 100-T221	Temperature data logger, 1-channel, L = 500 mm	1340-6505

## EBI 100-T241 Temperature Data Logger

### Bendable metal probe



- 1 external temperature sensor, axial, bendable, blunt, Ø 1.5 mm

For a suitable silicone protection box, please see page 33.

#### Technical Data

Measurement range	-40 °C ... +150 °C (-40 °F ... +302 °F)
Data memory	27,000 measurement values

Type	Description	Part No.
EBI 100-T241	Temperature data logger, 1-channel, L = 500 mm	1340-6512

## EBI 100-TP230 Temperature / Pressure Data Logger

### Rigid metal probe



- 1 external temperature sensor, axial, Pt 1000, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

#### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar to 4000 mbar
Data memory	2 x 9,000 measurement values

Type	Description	Part No.
EBI 100-TP230	Temperature / Pressure logger, 2-channel, L = 40 mm	1340-6554



## EBI 100-TP231 Temperature / Pressure Data Logger

*Luer-Lock connection*



- 1 external temperature sensor, axial, blunt, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar to 4000 mbar
Data memory	2 x 9,000 measurement values

Type	Description	Part No.
EBI 100-TP231	Temperature/pressure data logger, 2-channel, L = 40 mm	1340-6555

## EBI 100-TP200 Temperature / Pressure Data Logger

*Tube connection and M10x1 internal thread*



- 1 external temperature sensor, axial, Pt 1000, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar to 4000 mbar
Data memory	2 x 9,000 measurement values

Type	Description	Part No.
EBI 100-TP200	Temperature/pressure data logger, 2-channel, L = 40 mm, with tube connection	1340-6552



## Interfaces and Software Sets for EBI 100



- Set SI 1100** for EBI 10, EBI 100 and EBI 11
- 2-port Interface IF 100
  - Software Winlog.pro
  - USB connection
  - Includes antenna



- Set SI 1110** for EBI 100 and EBI 11
- 2-port Interface IF 100-1
  - Software Winlog.pro
  - USB connection



- Set SI 1200** for EBI 10 and EBI 100
- 4-port Interface IF 200
  - Software Winlog.pro
  - USB connection
  - Includes antenna



- Set SI 2100** for EBI 10, EBI 100 and EBI 11
- 2-port Interface IF 100
  - Software Winlog.med
  - USB connection
  - Includes antenna



- Set SI 2110** for EBI 10 and EBI 100
- 4-port Interface IF 200
  - Software Winlog.med
  - USB connection
  - Includes antenna

**all Sets:** Colored LEDs signaling programming, readout and incorrect development

Please find complete routine control sets on page 49.

For more information about EBI 100 accessories, please see page 33.

Type	Description	Part No.
SI 1100	Set: EBI IF 100 interface and Winlog.pro software	1340-6061
SI 1110	Set: EBI IF 100-1 interface and Winlog.pro software	1340-6561
SI 1200	Set: EBI IF 200 interface and Winlog.pro software	1340-6062
SI 2100	Set: EBI IF 100 interface and Winlog.med software	1340-6064
SI 2110	Set: EBI IF 200 interface and Winlog.med software	1340-6095

## Accessories for EBI 100

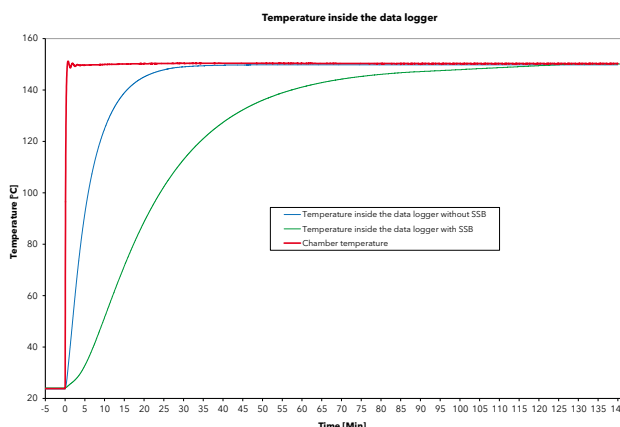


### Silicone protection box AL 100

for EBI 100-T241

- Protects temperature logger against heat peaks
- Protects temperature logger against mechanical damage
- Extends the life of temperature data loggers

Ø 78mm, Height: 44mm



### Battery change set AL 103

for EBI 10 and EBI 100

Consisting of 3 batteries, 3 O-rings with grease, cross slot screw driver, silicone grip and silicone protection box cover for battery exchange.

### AL 104 Battery Set

for EBI 10 and EBI 100

Consisting of 3 batteries and 4 O-rings with grease.



### Can adapter set EBI DA-Set

With this adapter set you can fix the data loggers at cans or plastic bags. Designed for data loggers of the EBI-series with axial, radial or external sensors. Hereby you assure the use to ensure proper sensor placement.



**Can adapter EBI DA**  
for bottle loggers  
(see page 29)



**Bottle adapter EBI FL-S**  
silicone  
for bottle loggers  
(see page 29)



**Grommets for sensor fixing EBI NI-140**  
Allows precise mounting of the logger sensor in cans and glass.



**Compression fitting EBI KV-3**  
Allows precise mounting of the logger sensor in glass (caps).

Please find complete routine control sets from page 49.

For EBI 100 interfaces and software, please see page 32.

Type	Description	Part No.
AL 100	Silicone protection box	1340-6020
AL 103	Battery change set for EBI 10 and EBI 100	1100-0117
AL 104	Battery set for EBI 10 and EBI 100, 3 batteries	1100-0118
EBI DA	Can adapter for bottle loggers	1340-1963
EBI DA-Set	Can adapter set	1340-1984
EBI FL-S	Bottle adapter, silicone	1340-1961
EBI NI-140	Grommets up to 140 °C / 284 °F (100 pieces)	1340-1988
EBI KV-3	Compression fitting EBI KV-3	1340-2005

# Data Loggers and



EBI 11  
Mini Temperature Data Loggers



EBI 11  
Mini Pressure / Temperature  
Data Loggers

## Description:

- High temperature accuracy of 0.1 °C across the full measurement range
- Temperature measurement up to +150 °C (+302 °F)
- Extra compact design for applications where space is tight

## Applications:

- For tight spaces, e.g. in small steam sterilizers, bottles, cans or bags
- Validation of processes in steam sterilizers and autoclaves
- Validation of processes in washer-disinfectors and washer-disinfectors for endoscopes
- Validation of processes in DAC Universal
- Validation at canning etc.

## Description:

- High temperature accuracy of 0.1 °C across the full measurement range
- Temperature measurement up to +150 °C (+302 °F)
- Pressure measurement up to 10 bar
- Extra compact design for applications where space is tight

## Applications:

- For tight spaces, e.g. in small steam sterilizers, bottles, cans or bags
- Validation of processes in steam sterilizers and autoclaves
- Validation of processes in washer-disinfectors and washer-disinfectors for endoscopes
- Validation of processes in DAC Universal
- Validation at canning etc.



# for Validation Routine Control



## Interfaces

---

### Description:

- Read out up to four Logger simultaneous
- Compatible with different types of logger
- Optic status control

### Applications:

- Programing and read out of data logger
  - Control of logger parameter
  - Service of logger e.g. battery exchange
-

## EBI 11 Mini Data Loggers

### The Perfect Solution for Tight Spaces

For temperature and pressure measurements in tight spaces, ebro offers the EBI 11 mini data loggers. Many configurations are available to suit your application, including data loggers with internal sensors, rigid metal probes, bendable metal probes, Luer-Lock connection or threaded connection versions.

The EBI 11 Mini Data Loggers are suitable not only for validation monitoring but can also be used for routine control monitoring.

Applications:

- For tight spaces, e.g. in small steam sterilizers, bottles, cans or bags
- Validation of steam sterilizers and autoclaves
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- Validation at canning etc.
- Pressure measurement up to 10 bar





Bendable metal probe



Rigid metal probe



Integrated (pressure) sensor



Luer-Lock connection



M5 thread connection



Interface

Programming the Data Loggers



Measurement During the Process



Automatic Data Evaluation

**General technical specifications: valid for all EBI 11 logger types\***

Accuracy: Temperature	±0.1 °C
Resolution: Temperature	0.01 °C
Accuracy: Pressure (pressure data loggers only)	±15 mbar (0 mbar ... 4000 mbar) ±20 mbar (4000 mbar ... 10000 mbar)
Resolution: Pressure (pressure data loggers only)	1 mbar
Sensor: Temperature	Pt 1000
Sensor: Pressure (pressure data loggers only)	Piezo resistive pressure sensor (temperature compensated)
Sampling rate	1 sec to 24 hours., adjustable
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Measurement start / stop time</li> <li>• Measure upon start time</li> <li>• Start immediately until end of memory</li> </ul>
Storage temperature	0 °C ... +60 °C (+32 °F ... +140 °F)
Battery	Lithium, 2 x BR1225 A, 3 V, user replaceable
Dimensions (Ø x h)	16.5 mm x 24 mm (without probe) <b>EBI 11-TP110:</b> 16.5 mm x 48 mm <b>EBI 11 Temperature Logger:</b> 16.5 mm x 24 mm (without probe) <b>EBI 11 Temperature / Pressure Logger:</b> 16.5 mm x 48 mm (without connector)
Weight	Approximately 45 g
Housing material	V4A
Protection class	IP 68
Certificate	Factory calibration certificate

\* Please find the exact technical data of each EBI 11 logger type on the next pages.

## EBI 11-P100 Mini Temperature / Pressure Data Logger *Integrated sensor*



- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive, temperature compensated

### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar to 10000 mbar
Data memory	2 x 7,500 measurement values
Sensor: temperature	Pt 1000, internal
Sensor: pressure	Piezo-resistive, internal, temperature compensated
Operating temperature	0 °C ... +150 °C (+32 °F ... +302 °F)

Type	Description	Part No.
EBI 11-P100	Mini Temperature / Pressure Data Logger, 1-channel	1340-6295

## EBI 11-P111 Mini Temperature / Pressure Data Logger *Luer-Lock connection*



- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive, temperature compensated

### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar to 10000 mbar
Data memory	2 x 7,500 measurement values
Sensor: temperature	Pt 1000, internal
Sensor: pressure	Piezo-resistive, internal, temperature compensated
Operating temperature	0 °C ... +150 °C (+32 °F ... +302 °F)

Type	Description	Part No.
EBI 11-P111	Mini Temperature / Pressure Data Logger, 1-channel, Luerlock	1340-6296

## EBI 11-TP110 Mini Temperature / Pressure Data Logger *M5 thread connection*



- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive, temperature compensated

### Technical Data

Measurement range: temperature	0 °C ... +150 °C (+32 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 10000 mbar
Data memory	2 x 7,500 measurement values
Sensor: temperature	Pt 1000, internal
Sensor: pressure	Piezo-resistive, internal, temperature compensated
Operating temperature	0 °C ... +150 °C (32 °F ... +302 °F)

Type	Description	Part No.
EBI 11-TP110	Mini Temperature / Pressure Data Logger	1340-6297



## EBI 11-T23x Mini Temperature Data Logger Rigid metal probe



Please see page 12 for suitable bottle, can and bag adapters.



EBI 11-T230

- 1 external temperature sensor, axial, Pt 1000, Ø 3 mm

### Technical Data

Measurement range: temperature	-30 °C ... +150 °C (-22 °F ... +302 °F)
Data memory	15,000 measurement values
Operating temperature	-30 °C ... +150 °C (-22 °F ... +302 °F)

Type	Description	Part No.
EBI 11-T230	Mini Temperature Data Logger, 1-channel, ext., L = 20 mm	1340-6290
EBI 11-T231	Mini Temperature Data Logger, 1-channel, ext., L = 50 mm	1340-6292
EBI 11-T233	Mini Temperature Data Logger, 1-channel, ext., L = 100 mm	1340-6293

## EBI 11-T235 to T237 Mini Temperature Data Logger Rigid blunt metal probe



EBI 11-T235

- 1 external temperature sensor, axial, Pt 1000, Ø 2 mm

### Technical Data

Measurement range: temperature	-30 °C ... +150 °C (-22 °F ... +302 °F)
Data memory	15,000 measurement values
Operating temperature	-30 °C ... +150 °C (-22 °F ... +302 °F)

Type	Description	Part No.
EBI 11-T235	Mini Temperature Data Logger, 1-channel, ext., L = 25 mm, blunt	1340-6270
EBI 11-T236	Mini Temperature Data Logger, 1-channel, ext., L = 80 mm, blunt	1340-6271
EBI 11-T237	Mini Temperature Data Logger, 1-channel, ext., L = 165 mm, blunt	1340-6272

## EBI 11-T240 Mini Temperature Data Logger Bendable metal probe



- 1 external temperature sensor, axial, Pt 1000, bendable, Ø 1.5 mm

### Technical Data

Measurement range: temperature	-30 °C ... +150 °C (-22 °F ... +302 °F)
Data memory	15.000 measurement values
Operating temperature	-30 °C ... +150 °C (-22 °F ... +302 °F)

Type	Description	Part No.
EBI 11-T240	Mini Temperature Data Logger, 1-channel, ext., L = 250 mm, flexible	1340-6291

## Accessories for EBI 11



### Set SI 1100

for EBI 10, EBI 100 and EBI 11

- 2-port Interface IF 100
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna



### Set SI 1110

for EBI 100 and EBI 11

- 2-port Interface IF 100-1
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development



### SI 1300 Set

for EBI 11

- 4-port Interface IF 300
- Software Winlog.pro
- USB connection
- Colored LED signalling programming, readout and incorrect development



### Set SI 2100

for EBI 10, EBI 100 and EBI 11

- 2-port Interface IF 100
- Software Winlog.med
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna



### SI 3300 Set

for EBI 11

- 4-port Interface IF 300
- Software Winlog.validation
- USB connection
- Colored LED signalling programming, readout and incorrect development





**Battery change set AL 113**  
for EBI 11

Suitable for 3 battery exchanges; contains 6 batteries, 3 O-rings with grease and changing tools.



**AL 114 can/bag adapter set**  
for EBI 11-T231 and EBI 11-T233



**Bottle adapter set AL 115**  
for EBI 11-T230

**Battery change set AL 113L**  
for EBI 11

Suitable for 10 battery exchanges; contains 20 batteries, 10 O-rings with grease and changing tools.



**Sealing kit EBI11-Valiset**

The set contains 5 seals. Developed for DAC universal and spypach dummy .

Type	Description	Part No.
SI 1100	Set: EBI IF 100 interface and Winlog.pro software	1340-6061
SI 1110	Set: EBI IF 100-1 interface and Winlog.pro software	1340-6561
SI 1300	Set: EBI IF 300 interface and Winlog.pro software	1340-6063
SI 2100	Set: EBI IF 100 interface and Winlog.med software	1340-6064
SI 3300	Set: EBI IF 300 interface and Winlog.validation software	1340-6069
AL 113	Battery changing set for EBI 11	1100-0120
AL 113L	Battery changing set for EBI 11	1100-0125
AL 114	Can / bag adapter set for EBI 11-T231 and EBI 11-T233	1340-6298
AL 115	Bottle adapter set for EBI 11-T230	1340-6299
Sealing kit	Sealing kit EBI11-Valiset	1340-0006



# Validation and Routine Control Sets



Complete Validation Sets

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**Description:**

- Validation data loggers with evaluation software and an extensive range of accessories
- German TÜV Industrial Services certified
- Software conforms with FDA 21 CFR Part 11

**Applications:**

- Validation of pasteurisation and sterilization processes
- Validation of steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes as well as DAC Univesal



Complete Routine Control Sets

---

**Description:**

- Data loggers for routine control with evaluation software and extensive range of accessories
- Software conforms with FDA 21 CFR Part 11

**Applications:**

- Routine control of steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- Performing the Electronic Bowie Dick Test
- Routine control of pasteurization and bottle cleaning processes



## Complete Validation Sets

### Flexible Data Logger System for Thermal Validations

ebro offers a flexible measurement and documentation system for validating many different thermal processes. This reliable system includes easy to use wireless data loggers of the EBI 10 series placed directly in the process and the software Winlog.validation to evaluate the processes.

The sets can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

### Process Validation with Temperature and Pressure Data Loggers across many Applications in:

#### Medical Sector

- Washer-disinfectors
- Washer-disinfectors for endoscopes
- Bed pan washers
- Steam sterilizers
- Blood banks
- Medicine refrigerators
- Laboratories
- Freezers

#### Pharmaceutical Industry

- Steam sterilization
- Stability chambers
- Cold storage
- Validation of store houses
- Incubators
- Laboratories
- Freezers

#### Food Industry

- Retorts
- Pasteurization
- Spiral-cooker / cooler
- Transport facilities
- Freezers
- Refrigerators
- Smokehouse
- Ovens
- Full water autoclaves

### Benefits

- Full automatic and tamper-proof
- Broad range of wireless data loggers for all applications
- Highly flexible temperature wire probes (individually replaceable sensors)
- High accuracy PT 1000 temperature sensors
- High accuracy of up to  $\pm 0.1^{\circ}\text{C}$
- German TÜV Industrial Services certified software, conforms with FDA 21 CFR Part 11
- 2-year warranty



### The System Conforms with the Following Standards

- FDA 21 CFR Part 11
- ISO 17665
- EN 12830
- ISO 15883
- EN 13060
- DIN 58929

## SL 1220 Complete Validation Set for Washer-Disinfectors for Endoscopes



For the validation of thermal processes in washer-disinfectors for endoscopes according to ISO 15883.

This reliable system consists of user-friendly mini data loggers and an Endoscope-Dummy that can be placed directly in the processes.

The set also contains an evaluation software package that has been validated by the TÜV.



**The set contains:**

- 3 x EBI 11-T235 Mini-Temperature Data Logger, Needle length = 25 mm
- EBI 11-P111 Mini Pressure Data Logger
- Sealing kit EBI 11-Valiset
- EBI IF 300, 4-port Interface
- Winlog.validation, evaluation software
- spypach Endoscope-Dummy "spo-pro" Professional
- Aluminum carrying case

Adequate pH and conductivity meters, see page 48.

Type	Description	Part No.
SL 1220	Endoscope set validation PROFESSIONAL	1340-6085



## SL 2000 Complete Validation Set for washer-disinfectors



For the validation of washer-disinfectors according to ISO 15883.

The set can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

### The set contains:

- 3 x EBI 10-T441 temperature data loggers
- EBI 10-TP231 temperature/pressure data logger
- EBI IF 200 4-port Interface with USB connection and antenna
- TÜV Industrial Services certified Winlog.validation software
- Aluminum carrying case



Adequate pH and conductivity meters, see page 146.

Type	Description	Part No.
SL 2000	Validation set for washer-disinfectors	1340-6072

## SL 3000 Complete Validation Set for small steam sterilizers



For the validation of small steam sterilizers according to ISO 17665.

The set can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

### The set contains:

- EBI 10-TP453 temperature/pressure data logger with AL 101 silicone protection box
- EBI IF 200 4-port Interface with USB connection and antenna
- TÜV Industrial Services certified Winlog.validation software
- 6 x holding clamp for probes
- Aluminum carrying case



Adequate pH and conductivity meters, see page 146.

Type	Description	Part No.
SL 3000	Validation set for small steam sterilizers	1340-6079

## SL 3100 Complete Validation Set for large steam sterilizers



For the validation of steam sterilizers according to ISO 17665 as well as for the validation of washer-disinfectors and washer-disinfectors for endoscopes according to ISO 15883.

The set can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

### The set contains:

- 5 x EBI 10-T471 temperature data loggers with AL 107 silicone protection boxes
- EBI 10-TP453 temperature/pressure data logger with AL 101 silicone protection box
- EBI IF 200 4-port Interface with USB connection and antenna
- TÜV Industrial Services certified Winlog.validation software
- 12 x holding clamps for probes
- Aluminum carrying case



Adequate pH and conductivity meters, see page 146.

Type	Description	Part No.
SL 3100	Validation set for large steam sterilizers	1340-6080





## SL 3300 Complete Validation Set for DAC Universal, benchtop autoclaves as well as washer disinfectors

Very flexible data logger system to perform validations for various thermal processes in the DAC Universal and benchtop autoclaves according to ISO 17665/DIN 58929 as well as washer disinfectors according to ISO 15883.

This reliable system consists of user-friendly mini data loggers that can be placed directly in the processes and an evaluation software package that has been validated by the TÜV.

### The set contains:

- 2 x EBI 11-T235 Mini Temperature Data Logger, Needle length = 25 mm
- 2 x EBI 11-T236 Mini Temperature Data Logger, Needle length = 80mm
- EBI 11-T237 Mini Temperature Data Logger, Needle length = 165mm
- EBI 11-P111 Mini Pressure Data Logger
- Sealing-kit for EBI 11
- EBI IF 300, 4-port Interface
- Winlog.validation, Software
- EBI-TAK-ALU, Aluminum carrying case



Adequate pH and conductivity meters, see page 146.

Type	Description	Part No.
SL 3300	Validation set for DAC Universal, benchtop autoclaves as well as washer disinfectors	1340-6082

## AL 3310 Complete Lid Set for Validation DAC Universal



### The set contains:

- 1 x Validation lid for use EBI 11 data logger
- 1 x Lid for test soil
- 1 x rinse adapter test soil

Type	Description	Part No.
AL 3310	Complete lid set for validation DAC Universal	1340-6051

## Adequate pH- und Conductivity Meters for Validation Sets



Full description from Page 146.



### PHT 830

- pH Meter with temperature compensation
- Configuration directly on device using 5 buttons and display
  - Graphic LCD display with backlight
  - Logging function
  - Temperature compensated



### CT 830

- Conductivity Meter with auto range
- Configuration directly on device using 5 buttons and display
  - Graphic LCD display with backlight
  - Logging function
  - Temperature compensated

Type	Description	Part No.
PHT 830 SET 1	pH-Meter with plastic electrode	1340-5812
CT830 SET	Conductivity Meter with plastic electrode	1340-5835

## Accessories for PHT 830 and CT 830



**PHT 830**  
Electrode



**CT 830**  
Electrode



**Interfaceable**  
for PHT 830 and CT 830

Type	Description	Part No.
AT 830 pH K Binder	Plastic electrode	1339-0661
AT 830 C Binder	Plastic electrode	1339-0660
EBI IF 830	Interfaceable for PHT 830 and CT 830	1340-6011

## Data Logger Sets for Routine Control

- EBI 11 Mini Data Logger Sets**  
 for routine control of food processes.  
 SL 1200: for washer-disinfectors for endoscope (see page 51)  
 SL 4001: for temperature monitoring in cans (see page 53)  
 SL 4101: for temperature monitoring in bottles (see page 54)
- EBI 16 Bowie and Dick Test Sets**  
 for performing the Electronic Bowie and Dick Test according to the norms EN 285 / ISO 17665.  
 SL 1520: for steam sterilizers (see page 52)  
 SL 1620: for steam sterilizers and washer-disinfectors (see page 52)
- EBI 100 Precision Data Logger Sets**  
 for routine control of food processes and of medical processes according to the German guideline.  
 SL 1010: for bedpan washers (see page 49)  
 SL 1110: for steam sterilizers and washer-disinfectors (see page 50)  
 SL 4010: for temperature monitoring in tins (see page 54)  
 SL 4110: for temperature monitoring in bottles and cans (see page 55)  
 SL 4210: for temperature monitoring in different applications (see page 55)

The sets can individually be expanded or compiled yourself from one or more data loggers (EBI 11, EBI 16 or EBI 100), the appropriate interface and the corresponding software. Talk to us!

### SL 1010 Temperature data logger set for temperature monitoring and $A_0$ value calculation in bedpan washers



#### The set contains:

- EBI 100-T100 temperature data logger (see p. 28)
- Winlog.med Software
- EBI IF 150 Interface
- Aluminum carrying case
- pH & conductivity tester (see page 149)

Extend this set with an EBI 16 Data Logger (see page 25), and you will be able to perform Electronic Bowie and Dick Tests.



Type	Description	Part No.
SL 1010	EBI 100 data logger set for bed pan washers	1340-6570

SL 1110 **Temperature / pressure data logger set** for temperature and pressure monitoring as well as for  $A_0$  value calculation in steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes



**The set contains:**

- EBI 100-TP231 pressure / temperature data logger with Luer-Lock connection (see page 31)
- AL 101 Silicone protection box for logger
- Winlog.med Software
- EBI IF 150 Interface
- Aluminum carrying case
- pH & conductivity tester (see page 149)



Adequate pH and conductivity meters, see page 150.

Extend this set with an EBI 16 Data Logger (see page 25), and you will be able to perform daily Electronic Bowie and Dick Tests.

Type	Description	Part No.
SL 1110	EBI 100 Data logger set for steam sterilizers and washer-disinfectors	1340-6571

## SL 1200 Routine Control Set for Washer-Disinfectors for Endoscopes



For the routine control of washer-disinfectors for endoscopes according ISO 15883.

This reliable system consists of user-friendly mini data loggers and an Endoscope-Dummy that can be placed directly in the processes.

The set also contains an evaluation software package.

### The set contains:

- 1 x EBI 11-T235 Mini-Temperature Data Logger, Needle length = 25 mm
- EBI 11-P111 Mini Pressure Data Logger
- Sealing kit EBI 11-Valiset
- EBI IF 300, 4-port Interface
- Winlog.med, evaluation software
- spypach Endoscope-Dummy "spo-pro" Basic
- Aluminum carrying case

*Adequate pH and conductivity meters, see page 48.*



Type	Description	Part No.
SL 1200	Endoscope set routine control BASIC	1340-6083

## SL 1520 EBI 16 Bowie and Dick Test Set for steam sterilizers



For performing the Bowie and Dick Test according to the norms EN 285 and ISO 17665.



### The set contains:

- Bowie Dick Test Logger EBI 16 (see page 25)
- Winlog.med software
- EBI IF 150 Interface
- Aluminum carrying case

Type	Description	Part No.
SL 1520	EBI 16 Bowie and Dick Test Set for steam sterilizers	1340-6198

## SL 1620 EBI 16 Bowie and Dick Test Set for steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes



For performing the daily Bowie and Dick Test according to the norms EN 285 and ISO 17665 as well as for routine control.



### The set contains:

- Bowie Dick Test EBI 16 (see page 25)
- EBI 100-TP231 temperature/pressure data logger (see p. 31)
- Winlog.med software
- EBI IF 150 interface
- Aluminum carrying case

Type	Description	Part No.
SL 1620	EBI 16 Bowie and Dick Test Set for steam sterilizers and washer-disinfectors	1340-6573

SL 4001 **EBI 11 Mini Data Logger Set for Pasteurization and Sterilization**  
*for temperature monitoring in cans*



**The set contains:**

- EBI 11-T23x Mini temperature data logger:  
 Needle length: 20 mm,  
 50 mm or 100 mm  
*(Special needle lengths on request)*
- AL 114 can adapter set
- EBI IF 100 interface
- Winlog.pro software
- Aluminum carrying case



Please name us the correct type of data logger in your order.

Mini Temperature Data Logger, 1-channel  
 Type  
 Needle length = 20 mm      EBI 11-T230  
 Needle length = 50 mm      EBI 11-T231  
 Needle length = 100 mm      EBI 11-T233

Type	Description	Part No.
SL 4001	EBI 11 set for pasteurization and sterilization	1340-6091



## SL 4010 EBI 100 Data Logger Set for Pasteurization and Sterilization for temperature monitoring in tins



### The set contains:

- EBI 100-T230 Temperature Data Logger
- EBI DA-SET Can Adapter
- EBI IF 100-1 Interface
- Winlog.pro Software
- Aluminum carrying case

Type	Description	Part No.
SL 4010	EBI 100 Data logger set for pasteurization and sterilization	1340-6575

## SL 4101 EBI 11 Mini Data Logger Set for Pasteurization for temperature monitoring in bottles



### The set contains:

- EBI 11-T23x Mini temperature data logger:  
Needle length: 20 mm, 50 mm or 100 mm  
(Special needle lengths on request)
- AL 115 Bottle adapter set
- EBI IF 100 interface
- Winlog.pro software
- Aluminum carrying case



Please indicate the correct type of data logger in your order.

Mini Temperature Data Logger, 1-channel	
Type	
Needle length = 20 mm	EBI 11-T230
Needle length = 50 mm	EBI 11-T231
Needle length = 100 mm	EBI 11-T233

Type	Description	Part No.
SL 4101	EBI 11 Mini data logger set for pasteurization	1340-6093



SL 4110 **EBI 100 Data Logger Set for Pasteurization**  
*for temperature monitoring in bottles and cans*



**The set contains:**

- EBI 100-T261 Temperature Data Logger
- EBI FL-S Bottle Adapter
- EBI DA Can Adapter
- EBI IF 100-1 Interface
- Winlog.pro Software
- Aluminum carrying case

Type	Description	Part No.
SL 4110	EBI 100 Data logger set for pasteurization	1340-6576

SL 4210 **EBI 100 Basic Temperature Monitoring Set**  
*Temperature monitoring system for different applications*



**The set contains:**

- EBI 100-T100 Temperature Data Logger
- EBI IF 100-1 Interface
- Winlog.pro Software
- Aluminum carrying case

Type	Description	Part No.
SL 4210	EBI 100 Basic temperature monitoring set	1340-6577

# Cold Chain and Process



EBI 20  
Standard Data Loggers

**Description:**

- Data logger versions for temperature and humidity measurements available
- With internal and external temperature probes
- Very easy to use
- Excellent price-performance ratio

**Applications:**

- Transport monitoring
- Storage monitoring
- Process monitoring



EBI 25  
Wireless Data Logger System

**Description:**

- Radio data logger system for temperature and humidity measurements
- Other measurements can be integrated using Modbus over IP or other protocols

**Applications:**

- Continuous monitoring of cooling equipment, cool rooms and deep-freeze rooms
- Storage monitoring



# Monitoring



EBI 40  
Multi-Channel Temperature  
Data Logger



EBI 3x0  
USB Data Loggers

## Description:

- Temperature data logger for up to 6 or 12 thermocouple sensors with SMP connection
- Current measurement values and measurement curve shown on multi-color TFT display
- With USB connection for fast programming and readout of the measurement data

## Applications:

- Process monitoring
- Process validation

## Description:

- Single-use and multi-use data loggers for temperature and humidity measurement
- USB connection
- Automatic PDF report generation with all measurement data
- Easy programming of the data loggers via the free online configurator at [www.ebi300.com](http://www.ebi300.com), no special software required

## Applications:

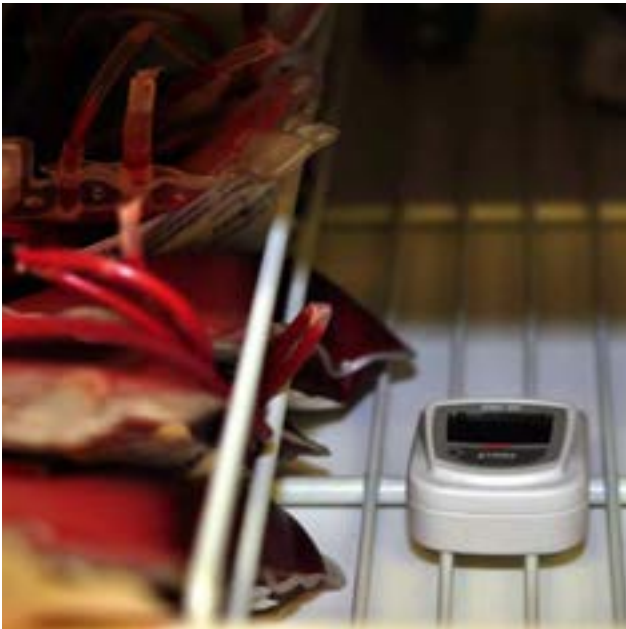
- Transport monitoring
- Storage monitoring

## EBI 20 Standard Data Loggers

With a memory capacity of 40,000 measurements the easy to use EBI 20 data loggers are suitable for the continuous documentation and monitoring of temperature and humidity. All EBI 20 data loggers are delivered with a factory calibration certificate and a user replaceable battery. The data loggers are particularly attractive because of their excellent price-performance ratio.

### Applications:

- Transport monitoring
- Storage monitoring
- Process monitoring





**General technical specifications: valid for all types\***

Resolution: Temperature	0.1 °C (0.2 °F)
Resolution: Humidity (only humidity data loggers)	0.1 % rH
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Start immediately until end of memory</li> <li>• Start / stop measurement</li> <li>• Start with key press</li> </ul>
Battery	3 V lithium (CR2450), user replaceable
Battery lifetime	Up to 24 months, at a sampling rate of 15 min. at +25 °C (77 °F)
Housing material	ABS
Dimensions (L x W x H)	69 x 48 x 22 mm**
Weight	Approximately 45 g**
Certificate	Factory calibration certificate

\* Please find the exact technical data of each EBI 20 logger type on the next pages.

\*\* Dimensions and weight just refer to the EBI 20 housing.

## EBI 20-T1 Standard Temperature Data Logger with internal temperature sensor



### Technical Data

Measurement range	-30 °C ... +70°C (-22 °F ... +158 °F) (please see the note on the next page)
Accuracy	±0.5 °C (-20 °C ... +40 °C) / ±0.9 °F (-4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Data memory	1 channel, 40,000 measurements
Sensor	NTC
Sampling rate	1 min to 24 hours
Protection class	IP 67

Type	Description	Part No.
EBI 20 T1	Temperature logger	1601-0042

## EBI 20-TE1 Standard Temperature Data Logger with external probe



### Technical Data

Measurement range	-30 °C ... +70°C (-22 °F ... +158 °F) (please see the note on the next page)
Accuracy	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Data memory	1 channel, 40,000 measurements
Sensor	NTC
Sampling rate	1 min to 24 h
Protection class	IP 67

Type	Description	Part No.
EBI 20-TE1	Temperature logger with external probe	1601-0043

## EBI 20-TF Standard Temperature Data Logger with external probe up to +100 °C (+212 °F)



### Technical Data

Measurement range	0 °C ... +100 °C (+32 °F ... +212 °F)
Accuracy	±0.5 °C (+50 °C ... +100 °C) ±1 °C for the remaining measurement range
Data memory	1 channel, 8000 measurements
Sensor	NTC
Storage temperature	-40 °C ... +70 °C / -40 °F ... 158 °F (logger) -40 °C ... +110 °C / -40 °F ... 230 °F (probe)
Sampling rate	Adjustable from 1 sec to 24 hours
Protection class	IP 67

Type	Description	Part No.
EBI 20-TF	Temperature data logger with external probe	1601-0010

## EBI 20-TH1 Standard Temperature / Humidity Data Logger with internal humidity sensor



### Technical Data

Measurement range: humidity	0 % rH ... 100 % rH
Accuracy: humidity	±3% rH (10% rH ... 90% rH)
Measurement range: temperature	-30 °C ... +70°C (-22 °F ... +158 °F) (please see the note below)
Accuracy: temperature	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Data memory	40,000 measurements
Channels	channel 1: relative humidity, channel 2: temperature
Sensor	NTC, capacitive humidity sensor
Sampling rate	1min ... 24h
Protection class	IP 52

Type	Description	Part No.
EBI 20-TH1	Temperature/Humidity Data Logger	1601-0044

## Sets and Accessories for EBI 20



**EBI 20-T1-Set** Temperature logger set (temperature logger, evaluation software, interface)



**EBI 20-TE1-Set** Temperature logger set (logger with external probe, evaluation software, interface)



**EBI 20-TF-Set** Temperature logger set (logger with external probe up to +100 °C (+212 °F), evaluation software, interface)



**EBI 20-TH1-Set** Temperature Humidity Logger Set (Logger, Evaluation software, Interface)



**EBI 20-IF Interface**



**EBI 20-WM wall bracket**



**EBI 20-WM-1 truck wall bracket**



The temperature measurement range of some EBI 20 models has been increased from +60 °C to +70 °C. This may require an update of the Winlog software.

Type	Description	Part No.
EBI 20-T1-Set	Temperature logger set (temperature logger, evaluation software, interface)	1601-0046
EBI 20-TE1-Set	Temperature logger set (logger with external probe, evaluation software, interface)	1601-0047
EBI 20-TF-Set	Temperature logger set (logger with external probe up to +100 °C (+212 °F), evaluation software, interface)	1601-0011
EBI 20-TH1-Set	Temperature Humidity Logger Set (logger, evaluation software, interface)	1601-0048
EBI 20-IF	Interface for EBI 20	1601-0020
EBI 20-WM	EBI 20 wall bracket with padlock	1601-0030
EBI 20-WM-1	EBI 20 truck wall bracket	1601-0033

## EBI 25 Wireless Data Logger System

The EBI 25 system for wireless monitoring of temperature, humidity and other measurements assures that perishable goods are produced and stored at the right conditions at all times. Other measurements can be integrated using Modbus over IP.

### Benefits:

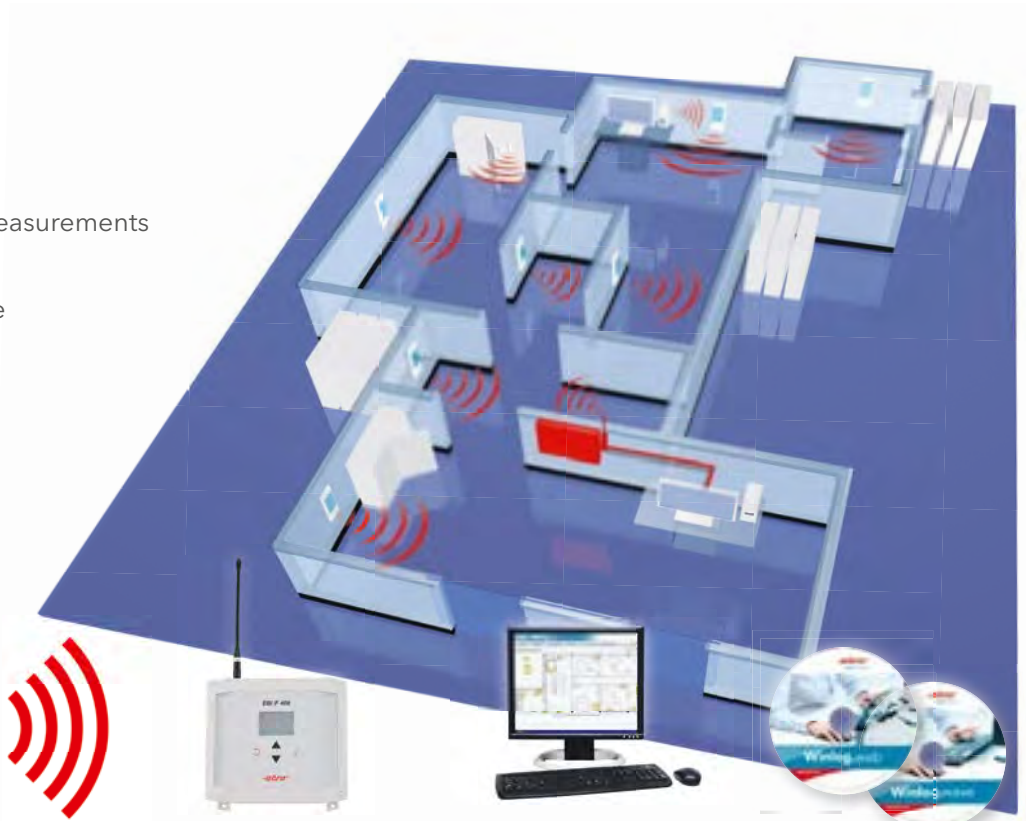
- Continuous monitoring
- Avoid loss of goods
- Quick intervention before it is too late
- Automatic documentation
- Worldwide access to the measurement data
- Easy handling, user replaceable battery





Embedding of other measurements possible:

- Differential pressure
- CO<sub>2</sub>
- Particles
- Power demand
- Many others



**EBI 25 data loggers**

- Precise measurement of temperature and humidity (depends on logger type)
- Very large range of up to 500 m in a free field
- Long battery lifetime
- Easy installation

**Base station: IF 400 interface**

- Collects and stores the data of all connected EBI 25 data loggers
- Connection of up to 50 loggers per interface possible
- Stores up to 576 measurements per logger
- Direct connection of any number of interfaces to a PC or the network
- Audible alarm (with optional alarm box)

**Evaluation software:**

**Winlog.web and Winlog.wave**

Winlog.wave: Basic version for local PC usage.

Winlog.web: Professional version for internet and local network based use.



*Please find more information from page 84.*

**General technical specifications: valid for all EBI 25 data logger types\***

Resolution: Temperature	0.1 °C (0.2 °F)
Resolution: Humidity (humidity data loggers only)	0.1% rH
Memory	288 measurement values (per channel)
Sampling rate	1 min. to 24 hours, adjustable
Radio frequency	868 MHz
Battery	3.6 V lithium (user replaceable)
Battery lifetime	Up to 2 years, depending on measurement and transmission rate
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Operating temperature	-30 °C ... +60 °C (-22 °F ... +140 °F)
Measurement mode	Endless measurement
Housing material	ABS
Weight	Approximately 65 g

\* Please find the exact technical data of each EBI 25 data logger type on the next pages.

## EBI 25-T Wireless Temperature Data Logger with internal temperature sensor



### Technical Data

Measurement range	-30 °C ... +60 °C (-22 °F ... +140 °F)
Accuracy	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Sensor	NTC
Protection class	IP67
Dimensions (L x W x H)	95 x 48 x 27 mm

Type	Description	Part No.
EBI 25-T	Wireless temperature logger (with internal sensor)	1340-6200

## EBI 25-TE Wireless Temperature Data Logger with external probe



### Technical Data

Measurement range	-40 °C ... +85 °C (-40 °F ... +185 °F)
Accuracy	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at 4 °F ... 104 °F) ±0.8 °C at -30 °C ... -20 °C / +40 °C ... +60 °C (±1.4 °F at -22 °F ... -4 °F / +104 °F ... +140 °F) ±1.5 °C at -40 °C ... -30 °C / +60 °C ... +85 °C (±2.7 °F at -40 °F ... -22 °F / +140 °F ... +185 °F)
Sensor	NTC
Probe	Ø 3.8 mm, L = 65 mm, with 2 m PUR cable
Protection class	IP 67
Dimensions (L x W x H)	95 x 48 x 27 mm (without probe)

Type	Description	Part No.
EBI 25-TE	Wireless temperature logger (with external probe)	1340-6201

## EBI 25-TX Wireless Temperature Data Logger for high and low temperatures



### Technical Data

Measurement range	-200 °C ... +199.9 °C (-328 °F ... +391.8 °F)
Accuracy*	±2 °C (-200 °C ... -100 °C) ±0.5 °C (-100 °C ... -20 °C and +60 °C ... +199.99 °C) ±0.2 °C (-20 °C ... +60 °C)
Probe	Ø 5 mm, L = 50 mm, with 3m PTFE cable
Probe connection	Binder, series 620
Sensor	Pt 1000
Protection class	IP 67
Dimensions (L x W x H)	135 x 48 x 27 mm (without probe)

\*Accuracy only applies when using an adjusted probe

Type	Description	Part No.
EBI 25-TX	Temperature data logger (with probe TPX 25-3)**	1340-6204
EBI 25-TX	Temperature data logger (without probe)	1340-0025
TPX 25-3	Pt 1000 probe for EBI 25-TX, 3 m	1341-0025
TPX 25-5	Pt 1000 probe for EBI 25-TX, 5 m	1341-0026
TPX 25-7,5	Pt 1000 probe for EBI 25-TX, 7,5 m	1341-0027
TPX 25-10	Pt 1000 probe for EBI 25-TX, 10 m	1341-0028

\*\* Calibration certificate valid only for logger and probe.

## EBI 25-TH Wireless Temperature / Humidity Data Logger with external humidity sensor



Filter caps for the protection of the humidity probe available;  
see page 142.

### Technical Data

Measurement range: Temperature	-30 °C ... +60 °C (-22 °F ... +140 °F)
Measurement range: Humidity	0% rH ... 100% rH
Accuracy: Temperature	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Accuracy: Humidity	±3 % rH (10 % ... 90 %)
Sensor	NTC for temperature / capacity humidity sensor
Protection class	IP 20
Dimensions (L x W x H)	124 x 48 x 27 mm (with probe)

Type	Description	Part No.
EBI 25-TH	Wireless temperature / humidity logger	1340-6202
AH 100	PTFE filter for EBI 25-TH	1340-5627
AH 200	Bronze sintered filter for EBI 25-TH	1340-5626
AH 300	Stainless steel sintered filter for EBI 25-TH	1340-5625

## Sets and Accessories for EBI 25

Please find evaluation software for EBI 25 data loggers starting from page 84.



**EBI 25-T-SET** Wireless temperature logger set (3 EBI 25-T loggers, evaluation software Winlog.wave, interface, 3 wall mounts)



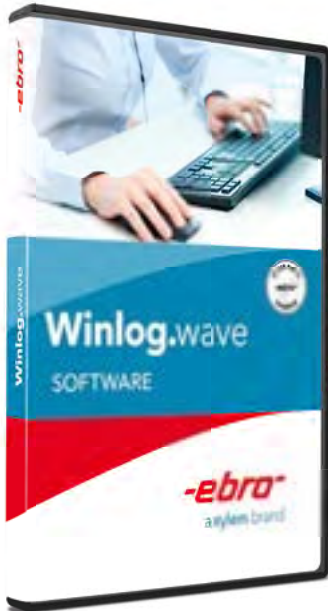
**EBI 25-TE-SET** Wireless temperature logger set (3 EBI 25-TE loggers, evaluation software Winlog.wave, interface, 3 wall mounts)



**EBI IF 400** Interface including antenna



**AG 152** Wall mount for EBI 25



**Winlog.wave** Evaluation software (single-user version)



**Winlog.web** Evaluation software (web-based server version)



### Winlog.mobile:

Free-of-charge app shipped with the Winlog.web

- Always up-to-date - anywhere
- All measurements at a glance
- Alarming via ring tone or vibration
- Display of the alarms list
- Forwarding the alarm messages to persons in charge
- For mobile phones with iOS or Android operating systems



**AL 116** external antenna for the interface EBI IF 400 interface for more power, optional

Type	Description	Part No.
EBI 25-T-SET	Wireless temperature logger set (3 EBI 25-T loggers, evaluation software Winlog.wave, interface, 3 wall mounts)	1340-6220
EBI 25-TE-SET	Wireless temperature logger set (3 EBI 25-TE loggers, evaluation software Winlog.wave, interface, 3 wall mounts)	1340-6221
EBI IF 400	Interface incl. antenna	1340-6210
AG 152	Wall mount for EBI 25	1340-6215
Winlog.wave	Software (single-user version)	1340-2391
Winlog.web	Software (web-based version)	1340-2390
AL 116	External antenna for EBI IF 400 for increasing the transmission power	1340-6211
EB SL-761-5	Ersatzbatterie für EBI 25	1100-0121

## EBI 40 Multi-Channel Temperature Data Logger

The EBI 40 Multi-Channel Temperature Data Logger records temperatures during process monitoring and validation. Current measurement values and the measurement curve can be read on the multi-colored TFT display. The thermal insulation using the thermo isolation box allows the use of the data logger at very high temperatures. The EBI 40 is suitable for the connection of up to six or twelve thermocouple probes.

### Applications:

Monitoring and validation of processes in:

- Incubators
- Refrigerators
- Climate cabinets
- Storage rooms,
- Transport studies
- Freeze-dryers etc.



## EBI 40-TC Multi-Channel Data Logger for type K thermocouple sensors



### Technical Data

Measurement range	-200 °C ... 1200 °C (-328 °F ... +2192 °F)
Accuracy	±0.5 °C (at 25 °C)
Resolution	0.1 °C (0.2 °F)
Channels	6 or 12 temperature channels
Sampling rate	Adjustable from 0.1 sec to 24 hours
Sensor	Thermocouple Type K / SMP connection
Operating temperature	0 °C ... +60 °C (0 °F ... +140 °F)
Storage temperature	0 °C ... +70 °C (32 °F ... 158 °F)
Memory	20,000 measurements per channel (max. 240,000 measurements)
Measurement mode	<ul style="list-style-type: none"> <li>• Endless measurement immediately</li> <li>• Measure immediately until end of memory</li> <li>• Start / stop measurement</li> </ul>
Display	TFT-display 3.5" (324 x 240 Pixel)
Dimensions (L x W x H)	140 x 118 x 35 mm
Housing material	ABS + PC
Protection class	IP 40
Certificate	Factory Calibration Certificate

Please find various thermocouple probes starting from page 122.

Type	Description	Part No.
EBI 40-TC-01	6-channel data logger (without probes)	1340-6400
EBI 40-TC-02	12-channel data logger (without probes)	1340-6401

## Accessories for EBI 40



**EBI TIB 400-01** Thermal Isolation Box for EBI 40  
Sturdy thermal barrier (stainless steel and ceramic)

- Heat resistant insulation
- Replaceable sealing and cooling element
- Easy to transport
- Protects EBI 40 for 2 hours at +250°C (+482 °F)
- Dimensions (with folded handles): 247 x 210 x 131 mm



**AN 141** Adapter cable, 1m silicone (SMP/Lemo size 0)



**AN 142** Extension cable, 1m silicone, SMP  
**AN 144** Extension cable, 2.5 m, silicone, SMP



Wall mount **EBI 40-WH** Bracket for 35 mm cap rail

Type	Description	Part No.
AN 141	Adapter cable, 1m silicone SMP/Lemo size 0	1341-2629
AN 142	Extension cable, 1m silicone, SMP	1343-2626
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627
EBI TIB 400-01	Thermal Isolation Box for EBI 40	1340-6430
EBI 40-WH	EBI 40 wall mount	1340-6431

## EBI 3x0 USB Data Loggers

### Cold Chain Monitoring

The easy to use data loggers with USB connection monitor the temperature and/or humidity during transport and storage of sensitive goods like medicine, food, serums etc. Measurement reports are created automatically as PDF files when you connect the logger to a PC.

The EBI 300 and EBI 310 USB data loggers are suitable for multi-use, the EBI 330 data loggers are single-use versions which can be ordered preconfigured and are used especially when returning a more expensive multi-use logger to the sender after a shipment is difficult. Please contact us for more information.





## Program | Measure

- Programming of the logger with the help of the free online configurator at [www.ebi300.com](http://www.ebi300.com) or optionally via the ebro software Winlog.basic, Winlog.light or Winlog.pro
- Set optional limits and start to record the measurement data

## Connect | Readout

- Connection of the logger to any PC via the USB port
- Automatic generation of a PDF report with all important measurement data

## Evaluate | Archive

- Store, save or email the PDF-report
- Further processing of the measurement data with the software Winlog.basic, Winlog.light or Winlog.pro

## Benefits

- Direct USB connection
- Automatic PDF report generation
- Programmable at [www.ebi300.com](http://www.ebi300.com), no special software for programming and readout required but available
- Indication of alarm status via flashing LED
- Data integrity
- Conforms with FDA 21 CFR Part 11, DIN EN 12830 and ATP
- The data loggers help you to comply with GMP and VO (EG) 37/2005
- Free firmware updates at your place via software
- Excellent value-for-money



## Digital interface

- Digital interface between loggers and external probes (at EBI 300 TE, EBI 300 TH, EBI 310 TE, EBI 310 TH, EBI 310 DI and EBI 310 TX).
- Data logger functions as data collector with optional internal sensor
- Easy exchange of the external probes e.g. for calibration: remove and send probe, connect replacement probe, measure!
- No calibration of the data collector required, if internal probe is not used!

## Which data logger is right for you?

Every EBI 3x0 USB data logger have the afore mentioned properties. Depending on the application, claim and your purse, there are different requirements for which we have the right devices. The following overview shall help making the decision.

	EBI 330-T30	EBI 330-T85	EBI 300	EBI 300 TE	EBI 300 TH	EBI 310	EBI 310 TE	EBI 310 DI	EBI 310 TX	EBI 310 TH
<b>Applications</b>										
Monitoring of deep temperatures		✓					✓	✓	✓*	
Monitoring of high temperatures							✓		✓*	
Humidity monitoring					✓					✓
Storage monitoring			✓	✓	✓	✓	✓	✓	✓*	✓
Transport monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓*	✓
Process monitoring				✓	✓		✓		✓*	✓
Usage within dry ice		✓						✓		
<b>Measurement channels</b>										
Internal temperature channel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External temperature channel				1	1		1	1	2*	1
Sensor cable				✓			✓	✓	✓*	
High precision (Pt 1000)		✓				✓	✓	✓	✓	✓
Humidity channel					✓					✓
<b>Usage</b>										
Multi-use			✓	✓	✓	✓	✓	✓	✓	✓
Single-use	✓	✓								
<b>Calibration certificate</b>										
Including factory calibration certificate			✓	✓	✓	✓	✓	✓	✓*	✓
Batch calibration certificate available upon request	✓	✓								
<b>Other features</b>										
Display			✓	✓	✓	✓	✓	✓	✓	✓
Very flexible alarms (5 limits and MKT)						✓	✓	✓	✓	✓
High memory capacity (120.000 measurements)						✓	✓	✓	✓	✓

\* with connected, exchangeable sensors

**General technical specifications: valid for both EBI 330 data logger types\***

Memory capacity	20,000 measurements
Alarm	2 limits
PDF creation	PDF/A 1b
LED	Yes (red and green)
Resolution	0.1 °C
Storage temperature	-30 °C ... +60 °C (-22 °F ... +140 °F)
Sample rate	1 min. to 24 hours
Measurement modes	<ul style="list-style-type: none"> <li>Start with key press</li> <li>Start immediately until end of memory</li> </ul>
Maximum start delay	24 h
Dimensions (L x W x H)	80 x 28 x 12 mm
Housing material	ABS
Protection class	IP 65
Certificate	Batch calibration certificate available on request

\* Please find the exact technical data of each EBI 330 data logger type on this page.

## EBI 330-T30 Single-Use USB Data Logger

### Standard version

**Technical Data**

Measurement range/operating temperature	-30 °C ... +60 °C (-22 °F ... +140 °F)
Accuracy	±0.5 °C (-20 °C ... +40 °C / -4 °F ... +104 °F) ±0.8 °C for the remaining measurement range
Sensor	NTC
Battery	Lithium button cell (CR2032), 3V
Battery lifetime	100 days plus 9 months on stock before usage

Type	Description	Part No.
EBI 330-T30	Single-use USB data logger, <b>package unit: 10 pieces</b>	1340-6332

## EBI 330-T85 Single-Use USB Data Logger

### Low temperature version

**Technical Data**

Measurement range/operating temperature	-85 °C ... +50 °C (-121 °F ... +122 °F)
Accuracy	±2.0 °C (-85 °C ... -30 °C / -85 °F ... -22 °F) ±0.8 °C (-30 °C ... -20 °C / -22 °F ... -4 °F) ±0.5 °C (-20 °C ... +50 °C / -4 °F ... +122 °F)
Sensor	Pt 1000
Battery	Lithium button cell (TL-2450), 3.6 V
Battery lifetime	100 days at temperatures down to -30 °C (-22 °F); 100 hours at temperature below -30 °C (-22 °F) plus 9 months on stock before usage

Type	Description	Part No.
EBI 330-T85	Single-use USB data logger for deep temperatures, <b>package unit: 10 pieces</b>	1340-6333

**General technical specifications: valid for EBI 300 data logger types\***

Memory capacity	40,000 measurements
Alarm	2 limits
PDF creation	PDF
LED	Yes (red)
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Sample rate	1 min ... 24 h
Measurement modes	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Start / Stop</li> <li>• Measurement until end of memory</li> <li>• Start with key press</li> </ul>
Display	Value, MIN / MAX, until end of memory, alarm on / off
Maximum start delay	72 h
Housing material	Polycarbonate
Certificate	Factory calibration certificate
Battery	Lithium button cell (CR 2450), 3 V
Battery lifetime	Up to 2 years, depending on applications
Norms	DIN EN 12830

\* Please find the exact technical data of each EBI 300 data logger type on this double page.

## EBI 300 Multi-Use USB Data Logger

### Standard version



The device has been certified together with the EB 4401 food inspection case (please see page 161).

**Technical Data**

Measurement range/operating temperature	-30 °C ... +70 °C (-22 °F ... +158 °F) <i>By connecting an external probe, the temperature measurement range can be extended.</i>
Accuracy	±0.5 °C (-20 °C ... +40 °C / -4 °F ... +104 °F) ±0.8 °C for the remaining measurement range
Sensor	NTC
Resolution	0.1 °C
Dimensions (L x W x H)	80 x 33 x 14 mm
Protection class	IP 65

Type	Description	Part No.
EBI 300	Standard USB Data Logger	1340-6330

## Accessories for EBI 300, EBI 300 TE and EBI 300 TH



EBI 300 TE + EBI 300 WM2



**EBI 300-WM2** Wall Mount for EBI 300 / 310



**EBI 300 WM3** transportation mount for EBI 300/310 made of stainless steel

Type	Description	Part No.
EBI 300-WM2	Wall Mount for EBI 300 / 310	1340-6341
EBI 300 WM3	Transportation mount for EBI 300/310	1340-6344

## EBI 300 TE Multi-Use USB Data Logger with external temperature probe

*Fast, flexible core temperature measurements*



EBI 300 TE

- Simultaneous measurement of core temperature and ambient temperature
- Internal temperature probe usable additionally

### Technical Data

Measurement range external temperature	-35 °C ... +70 °C (-31 °F ... +158 °F)
Measurement range internal temperature / operating temperature	-30 °C ... +70 °C (-22 °F ... +158 °F)
Accuracy (internal and external)	± 0.5 °C (-20 °C ... +40 °C / -4 °F ... +104 °F) ± 0.8 °C for the remaining measurement range
Probe	NTC, Stainless steel, Ø 4mm, L = 50mm, pointed
Cable	PVC, L = 1m, waterproof, oilproof and food safe
Resolution	0.1 °C
Dimensions (L x W x H)	91 x 33 x 14mm
Protection class	IP 65

Type	Description	Part No.
EBI 300 TE	USB Data logger with external temperature probe	1340-6335
TPC 300	Replacement probe for EBI 300 TE	1341-6331
TPC 300H	Replacement probe with handle for EBI 300 TE	1341-6370

## EBI 300 TH Multi-Use USB Data Logger with external humidity and temperature probe

*Relative humidity monitoring in storages and during transports*



EBI 300 TH

*Filter caps for the protection of the humidity probe available; see page 142.*

- Internal temperature probe usable additionally

### Technical Data

Measurement range temperature / operating temperature	-30 °C ... +70 °C (-22 °F ... +158 °F)
Accuracy (internal)	± 0.5 °C (-20 °C ... +40 °C / -4 °F ... +104 °F) ± 0.8 °C for the remaining measurement range
Accuracy (external)	± 0.5 °C (-20 °C ... +40 °C / -4 °F ... +104 °F) ± 1.0 °C for the remaining measurement range
measurement range humidity	0% rH ... 100% rH
Accuracy humidity	± 3% between 10% rH ... 90% rH (at 25 °C / +77 °F) ± 5% for the remaining measurement range
Probe humidity	Capacitive
Resolution temperature	0.1 °C
Resolution humidity	0.1% rH
Dimensions (L x W x H)	129 x 33 x 14mm
Protection class	IP 20

Type	Description	Part No.
EBI 300 TH	USB Data logger with external humidity probe	1340-6334
TPH 400	Replacement probe for EBI 300 TH	1341-6336
AH 100	PTFE filter	1340-5627
AH 200	Bronze sintered filter	1340-5626
AH 300	Stainless steel sintered filter	1340-5625

**General technical specifications: valid for all EBI 310 data logger types\***

Memory capacity	120,000 measurements
Alarm	5 ranges
PDF creation	PDF/A 1b
LED	Yes (red and yellow)
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Sample rate	1 s ... 24 h
Measurement modes	<ul style="list-style-type: none"> <li>• Endless measurement</li> <li>• Start / Stop</li> <li>• Measurement until end of memory</li> <li>• Start with key press</li> </ul>
Display	Value, MIN / MAX, until end of memory, alarm on / off
Maximum start delay	72 h
Housing material	Polycarbonate
Certificate	Factory calibration certificate
Norms	DIN EN 12830

\* Please find the exact technical data of each EBI 310 data logger type on the next pages.

## EBI 310 Multi-Use USB Data Logger

### High precision version

**Technical Data**

Measurement range/operating temperature	-30 °C ... +75 °C (-22 °F ... +167 °F) <i>By connecting an external probe, the temperature measurement range can be extended.</i>
Accuracy	±0.2 °C (-30 °C ... +30 °C / -22 °F ... +86 °F) ±0.5 °C for the remaining measurement range
Sensor	PT 1000
Resolution	0.1 °C
Dimensions (L x W x H)	80 x 33 x 14 mm
Protection class	IP 65
Battery	Lithium button cell (CR 2450), 3 V
Battery lifetime	Up to 2 years, depending on applications

Type	Description	Part No.
EBI 310	High Precision USB Data Logger	1340-6331

## Accessories for the EBI 310, EBI 310 TE, EBI 310 DI, EBI 310 TX and EBI 310 TH



**EBI 300-WM2** Wall Mount for EBI 300 / 310



**EBI 300 WM3** transportation mount for EBI 300/310 made of stainless steel

Type	Description	Part No.
EBI 300-WM2	Wall Mount for EBI 300 / 310	1340-6341
EBI 300 WM3	Transportation mount for EBI 300/310	1340-6344

## EBI 310 TE Multi-Use USB Data Logger with external precision temperature probe



### Measurement of high and low temperatures



EBI 310 TE

- Simultaneous measurement of core temperature and ambient temperature
- Internal temperature probe usable additionally

#### Technical Data

Measurement range external temperature	-200°C ... +250°C (-328 °F ... +482 °F)
Measurement range internal temperature / operating temperature	-30 °C ... +75°C (-22 °F ... +167 °F)
Accuracy (internal)	± 0.2 °C (- 30 °C ... + 30 °C / -22 °F ... +86 °F) ± 0.5 °C for the remaining measurement range
Accuracy (external)	± 2.0 °C (- 200 °C ... -100 °C / -328 °F ... -148 °F) ± 1.0 °C (- 100 °C ... -20 °C / -148 °F ... -4 °F) ± 0.2 °C (- 20 °C ... + 60 °C / -4 °F ... +160 °F) ± 0.5 °C (+60 °C ... + 250 °C / +160 °F ... +482 °F)
Probe	Pt 1000, Stainless steel, Ø 5mm, L = 50mm, blunt
Cable	PTFE, L = 1m, waterproof, oilproof and food safe
Resolution	0.1 °C
Dimensions (L x W x H)	91 x 33 x 14 mm
Protection class	IP 65
Battery	Lithium button cell (CR 2450), 3V
Battery life time	Up to 2 years, depending on applications

Type	Description	Part No.
EBI 310 TE	USB Data logger with external precision temperature probe	1340-6337
TPX 220	Replacement probe for EBI 310 TE	1341-6332
TPX 220-3	Replacement probe with 3m cable for EBI 310 TE	1341-6332-0001

## EBI 310 DI Multi-Use USB Data Logger for dry ice measurements



### Precise temperature measurements in dry ice



EBI 310 DI

- Additional battery allows usage within dry ice
- Internal temperature probe usable additionally

#### Technical Data

Measurement range external temperature / operating temperature	-85°C ... +50°C (-121 °F ... +122 °F)
Measurement range internal temperature	-30 °C ... +75°C (-22 °F ... +167 °F)
Accuracy (internal)	± 0.2 °C (- 30 °C ... + 30 °C / -22 °F ... +86 °F) ± 0.5 °C for the remaining measurement range
Accuracy (external)	± 1.0 °C (- 85 °C ... -20 °C / -121 °F ... -4 °F) ± 0.2 °C (- 20 °C ... + 50 °C / -4 °F ... +122 °F)
Probe	Pt 1000, Stainless steel, Ø 5mm, L = 50mm, blunt
Cable	PTFE, L = 60cm, waterproof, oilproof and food safe
Resolution	0.1 °C
Dimensions (L x W x H)	100 x 33 x 14mm
Protection class	IP 65
Battery	Lithium button cell in the logger, lithium battery in the probe, both changeable by the user
Battery life time	10 transports of up to 100h each

Type	Description	Part No.
EBI 310 DI	USB Data logger for dry ice measurements	1340-6338
TPX 250	Replacement probe for EBI 310 DI	1341-6333
AL 118	Battery change set for TPX 250	1100-0126

## EBI 310 TH Multi-Use USB Data Logger with with external humidity and temperature probe

*Relative humidity monitoring in storages and during transports*



EBI 310 TH

Filter caps for the protection of the humidity probe available; see page 142.

- Internal temperature probe usable additionally

### Technical Data

Measurement range temperature / operating temperature	-30 °C ... +75°C (-22 °F ... +167 °F)
Accuracy (internal)	± 0.2 °C (- 30 °C ... + 30 °C / -22 °F ... +86 °F) ± 0.5 °C for the remaining measurement range
Accuracy (external)	± 0.5 °C (0 °C ... + 60 °C / +32 °F ... +140 °F) ± 0.8 °C for the remaining measurement range
Probe temperature	Pt 1000
Measurement range humidity	0% rH ... 100% rH
Accuracy humidity	± 2% between 10% rH ... 90% rH (at 25 °C / +77 °F) ± 4% for the remaining measurement range
Probe humidity	capacitive
Resolution temperature	0.1 °C
Resolution humidity	0.1% rH
Dimensions (L x W x H)	129 x 33 x 14mm
Protection class	IP 20
Battery	Lithium button cell (CR 2450), 3V
Battery life time	Up to 2 years, depending on applications

Type	Description	Part No.
EBI 310 TH	USB Data logger with external humidity probe	1340-6336
TPH 500	Replacement probe for EBI 310 TH	1341-6337
AH 100	PTFE filter	1340-5627
AH 200	Bronze sintered filter	1340-5626
AH 300	Stainless steel sintered filter	1340-5625

## EBI 310 TX Multi-Use USB Data Logger with temperature-two-channel-adapter



*Temperature monitoring in storages and during transport, process monitoring*



EBI 310 TX



exchangeable sensors

- Up to two exchangeable probes can be connected; not included, see the following page
- Internal temperature probe usable additionally

### Technical Data

Measurement range external temperature	-200°C ... + 400°C (-328 °F ... +752 °F), dependent on probe type
Measurement range internal temperature / operating temperature	-30 °C ... +75°C (-22 °F ... +167 °F)
Accuracy (internal)	± 0.2 °C (- 30 °C ... + 30 °C / -22 °F ... +86 °F) ± 0.5 °C for the remaining measurement range
Probe	Pt 1000
Resolution	0.1 °C
Dimensions (L x W x H)	111 x 33 x 14mm
Protection class	IP 65
Battery	Lithium button cell (CR 2450), 3V
Battery life time	Up to 2 years, depending on applications

Type	Description	Part No.
EBI 310 TX	USB Data logger with temperature-two-channel-adapter	1340-6339
TPX 310	Replacement adapter for EBI 310 TX	1341-6335



## Exchangeable probes for EBI 310 TX

**TPX 310-P1**

- Measurement range: -200 °C ... +200 °C (-328 °F ... +392 °F)
- Needle: L = 45 mm, Ø = 5 mm, blunt
- Cable: PTFE, L = 3 m

Temperature		Accuracy
-200...-100 °C	-328...-148 °F	1.7 °C
-100...-20 °C	-148...-4 °F	1.2 °C
-20...+60 °C	-4...+140 °F	1.0 °C
+60...+200 °C	+140...+392 °F	1.7 °C

**TPX 310-P2**

- Measurement range: -50 °C ... +180 °C (-58 °F ... +356 °F)
- Needle: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 3 m

Temperature		Accuracy
-50...+60 °C	-58...+140 °F	0.6 °C
+60...+180 °C	+140...+356 °F	0.9 °C

**TPX 310-P3**

- Measurement range: -50 °C ... +180 °C (-58 °F ... +356 °F)
- Needle: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 1 m

Temperature		Accuracy
-50...+60 °C	-58...+140 °F	0.5 °C
+60...+180 °C	+140...+356 °F	0.8 °C

**TPX 310-P4**

- Measurement range: +100 °C ... +400 °C (+212 °F ... +752 °F)
- Needle: L = 50 mm, Ø = 1.5 mm, blunt
- Cable: metal wrapped, L = 3 m, not waterproof

Temperature		Accuracy
+100...+250 °C	+212...+482 °F	1.1 °C
+250...+400 °C	+482...+752 °F	1.4 °C

**TPX 310-P5**

- Measurement range: -50 °C ... +180 °C (-58 °F ... +356 °F)
- Probe: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 5 m

Temperature		Accuracy
-50...-20 °C	-58...-4 °F	0.5 °C
-20...+60 °C	-4...+140 °F	0.6 °C
+60...+180 °C	+140...+356 °F	0.8 °C

**TPX 310-P6**

- Measurement range: -50 °C ... +180 °C (-58 °F ... +356 °F)
- Probe: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 7.5 m

Temperature		Accuracy
-50...+60 °C	-58...+140 °F	0.7 °C
+60...+180 °C	+140...+356 °F	1.0 °C

**TPX 310-P7**

- Measurement range: -50 °C ... +180 °C (-58 °F ... +356 °F)
- Probe: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 10 m

Temperature		Accuracy
-50...+60 °C	-58...+140 °F	0.9 °C
+60...+180 °C	+140...+356 °F	1.1 °C

Type	Description	Part No.
TPX 310-P1	External sensor for EBI 310 TX	1341-6338
TPX 310-P2	External sensor for EBI 310 TX	1341-6339
TPX 310-P3	External sensor for EBI 310 TX	1341-6340
TPX 310-P4	External sensor for EBI 310 TX	1341-6341
TPX 310-P5	External sensor for EBI 310 TX	1341-6342
TPX 310-P6	External sensor for EBI 310 TX	1341-6343
TPX 310-P7	External sensor for EBI 310 TX	1341-6344

# Software

ebro offers exactly the software you need:

- Evaluation software for any applications: Winlog.basic, Winlog.light and Winlog.pro
- Evaluation software for EBI 25 data loggers: Winlog.web and Winlog.wave
- Evaluation software for pharmaceutical and medical applications: Winlog.med and Winlog.validation

Software/Features	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog.validation	Winlog.wave	Winlog.web
Event Triggered Recording			●	●	●		●
Script-Calculations			●				●
System-Scripts			●				
Picture Manager			●		●		
Measure in Charts			●				
Cursor		●	●	●	●		
Realtime Calculations			●	●	●		●
Ranges			●	●	●		
Range-based Calculations			●	●	●		
Statistics per Range			●	●	●		
Relative Time Axis			●				
Configurations		●	●	●(2)	●(2)		
Firmware-Update		●	●	●	●		●
Import		●(1)	●(1)				
Calibration			●	●	●		
Automatic File Name Generation			●				
21 CFR Part 11	●	●	●	●	●	●	●
User Administration	●	●	●	●	●	●	●
Audit-Trail	●	●	●	●	●	●	●
Advanced Chart Features		●	●				
Multi Document Support		●	●	●	●		
Export (Excel, PDF)	●	●	●	●	●	●	●
Customizable Company Logo	●	●	●	●	●	●	●
Wireless Support			●	●	●	●	●
2D Placement		●	●		●	●	●
3D Placement					●		
Routine Check			●(3)	●	●		
Validation			●(3)		●		
Unit Administration	●	●	●	●	●		●
Split Measurements			●	●	●		
Advanced Alarm-Management (Zones)	●(5)	●(5)	●(5)				
App Winlog.mobile							●

(1) Winlog.basic, Winlog.validation

(2) Template based

(3) Manual

(4) Since V2.5

(5) EBI 310 only

(6) Since V2.6

(7) Since V3.3

(8) Since V2.63

(9) Since V3.5



Supported Logger Types	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog.validation	Winlog.wave	Winlog.web
EBI 10		●	●	●	●		
EBI 11		●	●	●	●		
EBI 16				●(9)	●(9)		
EBI 20	●	●	●	●(7)	●(7)		
EBI 25						●	●
EBI 40		●	●	●(7)	●(7)		
EBI 100		●	●	●	●		
EBI 300	●(4)	●(4)	●(4)	●(7)	●(7)		
EBI 310	●(6)	●(6)	●(6)	●(7)	●(7)		
EBI 330	●(8)	●(8)	●(8)				

System Requirements	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog.validation	Winlog.wave	Winlog.web
Windows Vista / 32 bit	●	●	●	●	●	●	●
Windows Vista / 64 bit	●	●	●	●	●	●	●
Windows 7 / 32 bit	●	●	●	●	●	●	●
Windows 7 / 64 bit	●	●	●	●	●	●	●
Windows 8 / 32 bit	●	●	●	●	●	●	●
Windows 8 / 64 bit	●	●	●	●	●	●	●
Windows 10 / 32 bit	●	●	●	●	●	●	●
Windows 10 / 64 bit	●	●	●	●	●	●	●
Memory	≥ 1GB	≥ 1GB	≥ 1GB	≥ 1GB	≥ 1GB	≥ 1GB	≥ 2 GB
Hard Disc Memory	≥ 300 MB	≥ 300 MB	≥ 300 MB	≥ 1 GB	≥ 1 GB	≥ 1 GB	≥ 5 GB
CD/DVD Drive	●	●	●	●	●	●	●
Screen Resolution	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768
Processor	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Dual Core 2 GHz+	Dual Core 2 GHz+

Market Overview	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog.validation	Winlog.wave	Winlog.web
Food	●	●	●			●	●
Industry	●	●	●		●	●	●
Pharmaceutical		●	●		●		●
Medical		●	●	●	●		

Available Languages	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog.validation	Winlog.wave	Winlog.web
English	●	●	●	●	●	●	●
French	●	●	●	●	●	●	●
Italian	●	●	●	●	●	●	●
Spanish	●	●	●	●	●	●	●
Chinese	●	●	●	●	●	●	●
Japanese	●	●	●	●	●		
Korean			●	●	●		
Portuguese				●	●		
Greek				●	●		
Czech	●	●	●	●	●		
Swedish	●	●	●	●	●		
Dutch			●	●	●		
German	●	●	●	●	●	●	●
Turkish				●	●		
Polish				●	●		

# Evaluation Software for Any Applications

## Winlog.basic, Winlog.light, Winlog.pro

For programming and readout of ebro data loggers and for evaluating the measurement values ebro offers three different software versions: the **free Winlog.basic**, the **standard software Winlog.light** and the **professional software Winlog.pro**.

### Benefits

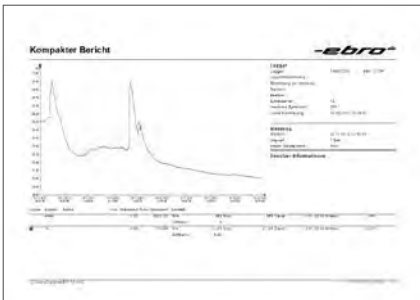
- Easy installation
- Easy programming of the data loggers, no prior knowledge required
- Extensive and custom report generation
- Suitable for all applications
- Security by compliance with FDA 21 CFR Part 11

### Extensive Report Generation

The software makes it easy to generate standard and custom reports:

- Compact, one-sided report (1)
- Multi-page, detailed report (2)
- Tabular report with the measurement values (3)
- Insertion of your own company logo possible (4)
- Export data to Microsoft Excel® and PDF (5)
- Integration of pictures and graphics possible (Winlog.pro only) (6)

(1)



(3)

The image shows a tabular report titled 'Tabularischer Bericht' from ebro. It displays a large grid of numerical data, likely representing measurement values over time. The ebro logo is visible in the top right corner.

(5)

The image shows a data export window from ebro software. It displays a grid of numerical data, similar to the tabular report, and includes options for exporting to Microsoft Excel and PDF. The ebro logo is visible in the top right corner.



(2)



(4)



(6)



## Winlog.basic

### Easy to use, free software

- User friendly: intuitive and easy to use
- Graphical and numerical display of measurement data
- Protocol print (with printer and computers)
- Scan and enlarge of the measurement data
- Data export to Microsoft® Excel and PDF
- FDA 21 CFR Part 11 functionality as an option

## Winlog.light

### Standard software

- Contains all the features of Winlog.basic
- Data import from other ebro application programs
- Many standard reports
- Displays statistics on measurement data (e.g. MIN/MAX, mean, standard deviation etc.)
- Creation of configurations possible

## Winlog.pro

### Professional software

- Contains all the features of Winlog.basic and Winlog.light
- Enables real-time monitoring with wireless data loggers
- Formula editor for calculating the F0-value of the absolute humidity, the PE value etc.
- Display of the timeline either absolute or relative
- Customized definition of individual areas possible (with their own statistics and calculations)
- Including calibration tool for data loggers
- Integration of pictures and graphics into reports possible
- IQ/OQ documentation optional

#### System Requirements

So that the software can run on your computer with any problem, your computer must meet the following requirements:

#### Hardware Requirements:

- At least 1 GHz processor speed
- At least 1 GB working memory
- At least 1 GB free hard disc space
- USB (Universal Serial Bus)

#### Software requirements:

- Operating system Microsoft®
- Windows Vista (32 Bit and 64 Bit)
  - Windows 7 (32 Bit and 64 Bit)
  - Windows 8 (32 Bit and 64 Bit)
  - Windows 10 (32 Bit and 64 Bit)



Type	Description	Part No.
Winlog.basic	Free evaluation software	1340-2375
Winlog.light	Standard evaluation software	1340-2354
Winlog.pro	Professional evaluation software	1340-2355
IQ/OQ Winlog.pro	Installation and Operation Qualifications for Winlog.pro	1340-2286

# Evaluation Software for EBI 25 Data Loggers

## Winlog.wave and Winlog.web

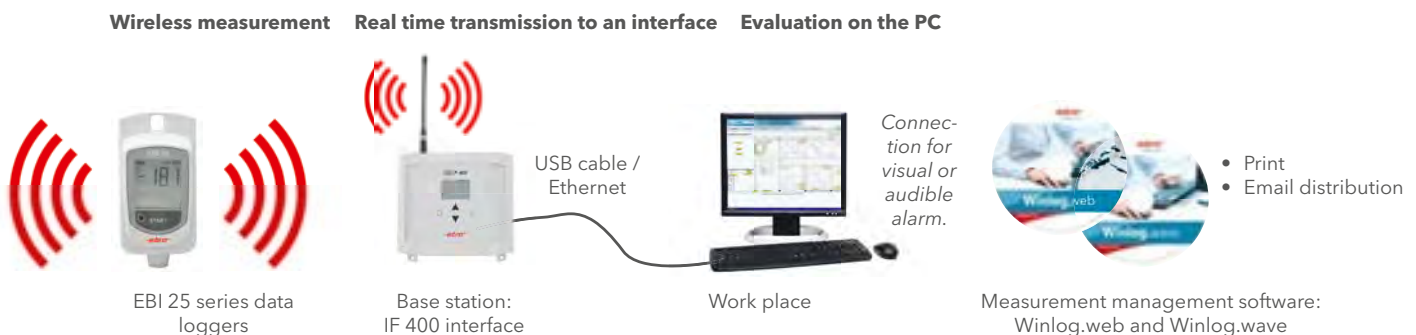
For programming and readout of EBI 25 data loggers as well as for evaluating the measurement values. The software automatically collects and evaluates data and alerts if necessary.

## Functionality

The innovative EBI 25 system monitors wirelessly, transmits the data in real time to an interface (base station) and from there to the desired server or PC.

As soon as a temperature, humidity or any other measurement has exceeded a user defined limit, an alarm is immediately sent via email.

*Please find the EBI 25 Data Logger Family starting on page 62.*



Quick graphical overview of all measurement points including an image or floor plan view:





## Winlog.wave

### Basic version for local PC usage

- Single PC solution: The basic version for easy measurement data evaluation on a single PC- no network required.
- Flexible alarm management: graphic and email alarm notifications upon user defined conditions
- Connection to the IF 400 via USB
- FDA 21 CFR Part 11 data security functionality



## Winlog.web

### Professional version internet and local network based use

- Web based client/server solution: the measurement data can be evaluated on all PCs and smartphones via the internet or connected to the local network
- Very flexible and wide alarm management: alarm notifications upon user defined conditions, alarm notification via email; visual and audible alarm via the graphical user interface
- Connection of the interface IF 400 via USB and Ethernet
- FDA 21 CFR Part 11 data security functionality
- Management of larger data sets
- IQ / OQ documentation available

For users of the software Winlog.web ebro has designed an App called



- free of charge - to monitor the performance via smartphone.

#### System Requirements

To enable the software to operate smoothly, your computer must meet the following requirements:

##### Hardware requirements:

- Processor speed minimum 2 GHz
- Working memory 2 GB
- 5 GB free hard disc space
- USB (Universal Serial Bus)

##### Software requirements:

- Operating System Microsoft®
- Windows Vista (32 Bit and 64 Bit)
  - Windows 7 (32 Bit and 64 Bit)
  - Windows 8 (32 Bit and 64 Bit)
  - Windows 10 (32 Bit and 64 Bit)

##### Further requirements:

- Mozilla Firefox 3.0
- Microsoft Internet Explorer 7



Type	Description	Part No.
Winlog.wave	Evaluation software (single-user version)	1340-2391
Winlog.web	Evaluation software (web-based server version)	1340-2390
IQ/OQ Winlog.web	Installation Qualification and Operation Qualification for Winlog.web	1340-2290

# Evaluation Software for Pharmaceutical and Medical Applications

## Winlog.med and Winlog.validation

The Winlog.med and Winlog.validation software versions is suitable for programming and readout of ebro data loggers as well as for evaluating the measurement values. The software guides you step by step through the validation or routine control process and evaluates the measurement automatically.

## Flexible Report Generation

Whether you need a short process report or a table report with all measurement data - ebro's Winlog software makes it easy.

Table report

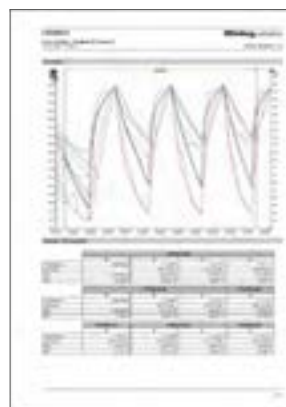
Detailed result overview

Process parameters, e.g. theoretical steam temperature calculation

Lethality report

Equipment used

Graphical data



Statistical data





## Winlog.med For routine controls

- User-friendly
- High precision measurements
- Automatic report generation
- Automatic user-defined calculations
- Automatic identification of process cycles
- Creation of user-defined masters for specific devices and thermal processes
- Three-dimensional demonstration of sensor placement
- FDA 21 CFR Part 11



## Winlog.validation For routine control and validation

Powerful report and evaluation software fitting the requirements of validation and qualification in Pharmaceuticals and Medicine.

- TÜV Industrial Services certified
- User-friendly
- High precision measurements
- Automatic report generation
- Automatic user-defined calculations
- Automatic identification of process cycles
- Creation of user-defined masters for specific devices and thermal processes
- Three-dimensional demonstration of sensor placement
- FDA 21 CFR Part 11
- IQ / OQ available
- Automatic completion of validation processes



### System Requirements

To enable the software to operate smoothly, your computer must meet the following requirements:

#### Hardware requirements:

- Processor speed minimum 1 GHz
- Working memory 1 GB
- 1 GB free hard disc space
- USB (Universal Serial Bus)

#### Software requirements:

- Operating System Microsoft®
- Windows Vista (32 Bit und 64 Bit)
  - Windows 7 (32 Bit und 64 Bit)
  - Windows 8 (32 Bit und 64 Bit)
  - Windows 10 (32 Bit und 64 Bit)



Type	Description	Part No.
Winlog.med	Standard evaluation software for routine controls	1340-2363
Winlog.validation	Professional evaluation software for routine controls and validations	1340-2394
IQ/OQ Winlog.validation	Installation Qualification and Operation Qualification for Winlog.validation	1340-2287

# Handhelds

ebro offers handheld instruments for many different measurement tasks:

- Core thermometers
- Conformity valued thermometer
- Fold-back thermometers
- Infrared thermometers
- pH measurement devices
- Hygrometers
- Salt meter
- Food oil meter
- Refractometers





# Temperature

ebro offers a wide variety of thermometers for various applications:



## EX-Thermometers

### Description:

- Thermo element Type K thermometer with exchangeable probes
- Applicable to be used within potentially explosive areas according to EN 60079-0:2012 and EN 60079-11:2012

### Applications:

- Temperature measurement within potentially explosive areas
- Process and facility monitoring
- Examination in laboratories
- Usage during the production or examination of e.g. solvent-based products, fuels and gases



## Thermometers

### Description:

- Thermometers with fixed probes or exchangeable probes
- Thermometers with rigid probes or probes with cable and hand grip
- Broad range of various probes available for certain models

### Applications:

- Surface temperature measurement
- Core temperature measurement





## Folding Thermometers

### Description:

- Thermometers with foldable probe for safe and convenient measurement and storage
- One certain model is available with infrared measurement technology

### Applications:

- Core temperature measurement
- Surface temperature measurement (via infrared)



## Infrared Thermometers

### Description:

- Non-contact surface temperature measurement with infrared technology
- Measurement anywhere where direct contact is not possible or convenient
- Various models with additional penetration probe, humidity probe or SMP connection available

### Applications:

- Non-contact surface temperature measurement
- Core temperature measurement (via external probe)
- Humidity measurement

## EX-Thermometers

On the next pages you will find our re-released EX-thermometers of the TFN 5x0 series, together with accessories. The various probes, specifically examined for their aptitude for EX applications, allow for the measurement of temperature within potentially explosive areas.

### Applications

- emperature measurement within potentially explosive areas:



**II 2G Ex ia IIC T4 Gb**

**II 2G Ex ia IIIB T135°C Db**

for environmental temperatures up to +60°C

- Process and facility monitoring
- Examination in laboratories
- Usage during the production or examination of e.g. solvent-based products, fuels and gases



## TFN 520-EX Typ K Thermometer

### 1-channel high accuracy thermometer for EX-areas



- With lemo connection
- Robust design for years of Industrial use
- Approximately 5 years battery life time

#### Technical Data

Measurement range	-20 °C ... +80 °C
Accuracy at +25 °C	±0.3 °C
Resolution	0.1 °C
Operating temperature	-5 °C ... +60 °C
Storage temperature	-25 °C ... +60 °C
Measurement interval	0.5 Sek. bis 15 Sek.
Sensor	External; thermo element type K
Sensor connection	LEMO size 0
Channels	1
Battery	Lithium, 3 V CR 2477
Battery life time	5 years
Dimensions (l x w x h)	115 x 54 x 22 mm
Weight	Approximately 90 g
Housing material	ABS, metalized
Protection class	IP 52

Approximately available from Q2 2016

Type	Description	Part No.
TFN 520-EX	1-channel EX thermometer	1340-5521-EX

## TFN 530-EX Type K Thermometer

### 2-channel high accuracy thermometer for EX-areas



- With lemo connection
- Robust design for years of Industrial use
- Approximately 5 years battery life time

#### Technical Data

Measurement range	-20 °C ... +80 °C
Accuracy at +25 °C	±0.3 °C
Resolution	0.1 °C
Operating temperature	-5 °C ... +60 °C
Storage temperature	-25 °C ... +60 °C
Measurement interval	0.5 Sek. bis 15 Sek.
Sensor	External; thermo element type K
Sensor connection	LEMO size 0
Channels	2
Battery	Lithium, 3 V CR 2477
Battery life time	5 years
Dimensions (l x w x h)	115 x 54 x 22 mm
Weight	Approximately 90 g
Housing material	ABS, metalized
Protection class	IP 52

Approximately available from Q2 2016

Type	Description	Part No.
TFN 530-EX	2-channel EX thermometer	1340-5531-EX

## Thermo element Type K-probes for TFN 5x0 EX thermometers

### EX-rod probes

*Temperature measurement of air, surfaces, fluids and gases*



#### TPN 100-EX

- Probe (L = 185 or 300 mm, Ø 0.5 mm, pointed, inconel needle, with Lemo connection)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2m/s): 0.4 sec



#### TPN 110-EX

- Probe (L = 185, 300 or 500 mm, Ø 1 mm, pointed, inconel needle, with Lemo connection)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2m/s): 1 sec



#### TPN 120-EX

- Probe (L = 185, 300, 500, 600, 700 or 1000 mm, Ø 1.5 mm, pointed, inconel needle, with Lemo connection)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2 m/s): 2sec



#### TPN 140-EX

- Probe (L = 185 or 300 mm, Ø 3 mm, pointed, inconel needle, with Lemo connection)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2 m/s): 4 sec





## EX-Thermal wire probes

### Temperature measurement of air, surfaces and gases



#### TPN 600-EX

- Probe (L = 1 m, outside 1.9 x 1.2 mm, Isolation: glass/silk meshwork, with Lemo connection)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t<sub>99</sub> Air 0.2 m/s): 25 sec



*Additional accessories for using the TFN 5x0 EX thermometers outside the EX-area can be found from page 108.*



*Approximately available from Q2 2016*

Type	Description	Part No.
TPN 100-EX	Rod probe without cable, L = 185 mm, Ø 0.5 mm, pointed	1341-0611-EX
TPN 100-30-EX	Rod probe without cable, L = 300 mm, Ø 0.5 mm, pointed	1341-0805-EX
TPN 110-EX	Rod probe without cable, L = 185 mm, Ø 1 mm, pointed	1341-0810-EX
TPN 110-30-EX	Rod probe without cable, L = 300 mm, Ø 1 mm, pointed	1341-0812-EX
TPN 110-50-EX	Rod probe without cable, L = 500 mm, Ø 1 mm, pointed	1341-0814-EX
TPN 120-EX	Rod probe without cable, L = 185 mm, Ø 1.5 mm, pointed	1341-0609-EX
TPN 120-30-EX	Rod probe without cable, L = 300 mm, Ø 1.5 mm, pointed	1341-0400-EX
TPN 120-50-EX	Rod probe without cable, L = 500 mm, Ø 1.5 mm, pointed	1341-0406-EX
TPN 120-60-EX	Rod probe without cable, L = 600 mm, Ø 1.5 mm, pointed	1341-0409-EX
TPN 120-70-EX	Rod probe without cable, L = 700 mm, Ø 1.5 mm, pointed	1341-0412-EX
TPN 120-100-EX	Rod probe without cable, L = 1000 mm, Ø 1.5 mm, pointed	1341-0414-EX
TPN 140-EX	Rod probe without cable, L = 185 mm, Ø 3 mm, pointed	1341-0607-EX
TPN 140-30-EX	Rod probe without cable, L = 300 mm, Ø 3 mm, pointed	1341-0415-EX
TPN 600-EX	Flexible thermal wire probe without cable, L = 1 m, outside 1.9 x 1.2 mm	1341-0646-EX

# Thermometers

On the next pages you will find a broad range of thermometers with fixed probes or exchangeable probes with rigid probes or probes with cable and hand grip. The thermometers are applicable at the broadest site of applications.

## Applications

- Core temperature measurement
- Surface temperature measurement
- Temperature measurement of fluids
- Environmental temperature measurement
- Process monitoring
- Temperature regulation



## Find your perfect thermometer:

Probe Thermometers	Measurement range	High accuracy	Probe type	Probe connection	Channels	Fast response time	MIN/MAX/hold	Waterproof housing	conformity valued	Control Thermometer
TFX 430 Precision Thermometer	-100 °C ... +500 °C	✗	Pt 100	Lemo	1		✗	✗		
TFX 422C Laboratory Thermometer	-50 °C ... +200 °C	✗	Pt 1000	Fixed	1		✗	✗	✗	
TFX 420 Core Thermometer without probe	-50 °C ... +400 °C	✗	Pt 1000	Lemo	1		✗	✗		
TFX 410-1 Core Thermometer without Probe	-50 °C ... +300 °C	✗	Pt 1000	Lemo	1			✗		
TFX 410 Core Thermometer	-50 °C ... +300 °C	✗	Pt 1000	Fixed	1			✗		
TFE 510 Core Thermometer	-50 °C ... +300 °C		Thermocouple type T	Lemo	1	✗		✗		
GFX 460 Electronic Control Thermometer	-50 °C ... +300 °C		Pt 1000	Fixed	1			✗		✗
GFX 460G Electronic Control Thermometer	-50 °C ... +300 °C		Pt 1000	Fixed glass-coated probe	1			✗		✗
GFX 460B Electronic Control Thermometer	-50 °C ... +300 °C		Pt 100	Lemo	1			✗		✗
TFN 520 Type K Thermometer	-200 °C ... +1200 °C	✗	Thermocouple type K	Lemo or SMP	1		✗			
TFN 520 Type J Thermometer	-100 °C ... +800 °C	✗	Thermocouple type J	Lemo or SMP	1		✗			
TFN 520 Type T Thermometer	-50 °C ... +300 °C	✗	Thermocouple type T	Lemo or SMP	1		✗			
TFN 520 Type E Thermometer	-100 °C ... +600 °C	✗	Thermocouple type E	Lemo or SMP	1		✗			
TFN 530 Type K Thermometer	-200 °C ... +1200 °C	✗	Thermocouple type K	Lemo or SMP	2		✗			
TFN 530 Type J Thermometer	-100 °C ... +800 °C	✗	Thermocouple type J	Lemo or SMP	2		✗			
TFN 530 Type T Thermometer	-50 °C ... +300 °C	✗	Thermocouple type T	Lemo or SMP	2		✗			
TFN 530 Type E Thermometer	-100 °C ... +600 °C	✗	Thermocouple type E	Lemo or SMP	2		✗			
TTX 120 Type K Thermometer	-60 °C ... +1200 °C		Thermocouple type K	SMP	1					
TTX 100 Type T Thermometer	-50 °C ... +350 °C		Thermocouple type T	Fixed rigid probe	1	✗				
TTX 110 Type T Thermometer	-50 °C ... +350 °C		Thermocouple type T	Fixed cable probe	1	✗				
TDC 110 Basic Thermometer	-50 °C ... +150 °C		NTC	Fixed	1					
TDC 150 Basic Thermometer	-50 °C ... +150 °C		NTC	Fixed	1			✗		

## TFX 430 Precision Thermometer

Reference thermometer with  
exchangeable Pt 100 probe



TFX 430 without probe    TFX 430 + TPX 130    TFX 430 + TPX 230    TFX 430 + TPX 330



TFX 430 set

Various probes available  
(please see page 99).

- MIN/MAX and hold options
- Approximately 5 years battery life time

### Technical Data

Measurement range	-100 °C ... +500 °C (-148 °F ... +932 °F)
Measurement accuracy	0.05 °C (-50 °C ... +199.99 °C) ±0.2 ° for the remaining measurement range
Resolution	0.01 °C (-10.00 °C ... +199.99 °C) 0.1 °C for the remaining measurement range
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Sensor	Pt 100
Sampling rate	1 sec to 15 sec
Battery	Lithium battery 3 V / 1 Ah, Type CR 2477
Battery lifetime	Approximately 5 years
Deactivation	Automatic after 2 hours, deactivatable
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Protection class	IP 67
Weight	Approximately 90 g

Type	Description	Part No.
TFX 430	Thermometer Pt 100 (without probe)	1340-5430
TFX 430 + TPX 130	Thermometer Pt 100 with probe (needle length = 200 mm, Ø 3 mm, blunt)	1340-5437
TFX 430 + TPX 230	Thermometer Pt 100 with probe (needle length = 200 mm, Ø 3 mm, pointed)	1340-5438
TFX 430 + TPX 330	Thermometer Pt 100 with probe (needle length = 190 mm, Ø 8 mm, glazed)	1340-5439
TFX 430 set	TFX set (Thermometer TFX 430, blunt probe TPX 130, extension cable AX 110, DAkKS calibration, Aluminum case AG130)	1340-5432

## Accessories for TFX devices



**AG 120 Artificial leather case**



**AG 130 Small case**



**AG 140 Protective cover for handheld devices, red**



**AG 150 Plastic bracket**, suitable for 10 mm and 12 mm lamus tripods



**AX 110 Extension cable for TFX 430 only**



**AG 170 Battery exchange set**

Type	Description	Part No.
AG 120	Plastic case	1341-0619
AG 130	Transport case	1341-3854
AG 140	Protective cover for handheld devices, red	1340-5005
AG 150	Plastic bracket	1340-5000
AX 110	Extension cable for TFX 430 (1m silicone)	1340-5020
AG 170	Battery-change set (incl. 3V lithium CR 2477 battery, needle, screws, tamping, O-ring, manual)	1100-0106

## Alternate probes for TFX 430

### *Pt 100, 4 conductors class A, Lemo size 1*

**TPX 130** blunt probe  
(Needle length= 200 mm, Ø 3 mm, stainless steel needle, up to +400 °C)



**TPX 230** pointed probe  
(Needle length = 200 mm, Ø 3 mm, stainless steel needle, up to +400 °C)



**TPX 330** blunt, glass coated probe  
(Needle length= 190 mm, Ø 8 mm, stainless steel needle, up to +400 °C)



### Technical Data

Accuracy	Pt 100, 4 conductors class A, Lemo size 1
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Type	Description	Part No.
TPX 130	Blunt probe, needle length = 200 mm, Ø 3 mm	1341-5437
TPX 230	Pointed probe, needle length = 200 mm, Ø 3 mm	1341-5438
TPX 330	Blunt, glass coated probe, blunt, needle length = 190 mm, Ø 8 mm	1341-5439

## TFX 422C Conformity Certified Laboratory Thermometer

with fixed Pt 1000 probe



The device has been certified together with the EB 4401 food inspection case (please see page 161).



Due to the new German calibration law which became effective on January 01 2015, we were forced to stop the sales of the TFX 422 Laboratory Thermometer with PTB certification. The so called certification of conformity replaces the calibration by the measurement office. Our new Conformity Certified Laboratory Thermometer TFX 422C is the equivalent successor: same properties, same quality.

### Technical Data

Measurement range	-50 °C ... +200 °C
Operating temperature	-25 °C ... +50 °C
Accuracy	± 0,3 °C
Sensor	Pt 1000, stainless steel, Ø 3mm, L = 120mm, pointed probe
Cable	Silicone, L = 60 cm or 150cm, waterproof, oil resistant, food safe
Response time (t <sub>90</sub> )	Approximately 8 Sec. (moving water)
Resolution	0,1 °C
Storage Temperature	-30 °C ... +70 °C
Dimensions (L x W x H)	109 x 54 x 22 mm, without probe
Weight	90g
Housing material	ABS
Protection class	IP 67
Battery	Lithium battery (CR 2477), 3V
Battery life time	Up to 5 years, dependent pn the application

- MIN/MAX and hold options
- High precision
- Approximately 5 years battery life time
- Waterproof (IP 67)

Type	Description	Part No.
TFX 422C-60	Conformity Certified Thermometer, with 60cm cable	1340-5433
TFX 422C-150	Conformity Certified Thermometer, with 150cm cable	1340-5434

## TFX-410/420 Series Core Thermometers



TFX 410



TFX 410-1



TFX 420

### General Technical Specifications

Accuracy	±0.3 °C
Resolution	0.1 °C
Sensor	Pt 1000
Operating temperature	-25 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Battery lifetime	Approximately 5 years
Housing material	ABS
Protection class	Waterproof (IP 67)
Weight	Approximately 90 g
Dimensions (L x W x H)	109 x 54 x 22 mm (without probe)
Deactivation	Automatic after 2 hours, deactivatable

### TFX 410 Core Thermometer with fixed Pt 1000 probe



- High precision
- Approximately 5 years battery life time
- Waterproof (IP 67)

#### Technical Data

Measurement range	-50 °C ... +300 °C (-58 °F ... +572 °F)
Battery	3.0 V lithium, user replaceable
Certificate	3-point factory calibration

Type	Description	Part No.
TFX 410	Thermometer with TPX 410 probe, pointed, 60 cm silicone cable	1340-5410
AG 190	Drill for frozen food (picture see page 115)	1341-3834

### TFX 410-1 Core Thermometer without Probe for various Pt 1000 probes



Various probes available  
(see page 103).

- High precision
- Approximately 5 years battery life time

#### Technical Data

Measurement range	-50 °C ... +300 °C (-58 °F ... +572 °F)
Sensor connection	Lemos size 0
Battery	3.0 V Lithium, replaceable
Certificate	3-point factory calibration

Type	Description	Part No.
TFX 410-1	Thermometer without probe	1340-5415
AG 190	Drill for frozen food (picture see page 115)	1341-3834

### TFX 420 Core Thermometer without Probe with MIN/MAX and hold options



Various probes available  
(see page 103).

- High precision
- Approximately 5 years battery life time

#### Technical Data

Measurement range	-50 °C ... +400 °C (-58 °F ... +752 °F)
Sensor connection	Lemos size 0
Battery	3.0 V Lithium, replaceable
Extra functions	Hold, MIN / MAX
Certificate	3-point factory calibration

Type	Description	Part No.
TFX 420	Thermometer without probe	1340-5425
AG 190	Drill for frozen food (picture see page 115)	1341-3834

## TFE 510-1 Core Thermometer without Probe with fast response time



TFE 510 TPE 400

- With replaceable probe
- Approximately 5 years battery life time

### Technical Data

Measurement range	-50 °C ... +300 °C (-58 °F ... +572 °F)
Accuracy	±0.5 °C (0.9 °F)
Resolution	0.1 °C (0.2 °F)
Measurement probe	Thermocouple, type T
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
Thermal constant ( $t_{99}$ )	3s
Battery	Lithium 3.0 V
Battery lifetime	Approximately 5 years
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Weight	Approximately 90g
Protection class	IP 67
Sampling rate	0.5 s to 15 s
Certificate	3-point factory calibration
Automativ shut off	After 2 hours, optional

Type	Description	Part No.
TFE 510-1	Thermometer without probe	1340-5510
TFE 510 + TPE 400	Thermometer with probe, with blue silicone cable, 0.6 m	1340-5516
TPE 400	Probe with blue silicone cable, 0.6 m, for TFE 510	1341-5516
AG 140	Protective cover for handheld devices, red	1340-5005
AG 190	Drill for frozen food (picture see page 115)	1341-3834

## Accessories for TFX- and TFE-Thermometers



**AG 130** Transport case



**AG 140** Protective cover for handheld devices, red



**AG 150** Plastic bracket suitable for 10 mm and 12 mm lamus tripods



**AG 160** Stainless steel bracket



**AG 170** Battery exchange set



**AX 100** Extension cable for TFX devices, 1m, Lemosa size 0



**AG 161** Stainless steel bracket for thermometers with protective cover AG 140

Type	Description	Part No.
AG 130	Transport case	1341-3854
AG 140	Protective cover for handheld devices, red	1340-5005
AG 150	Plastic bracket	1340-5000
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket for TFX devices in protective cover AG 140 (AG 140 not included)	1340-0596
AG 170	Battery-change set (incl. 3V lithium CR 2477 battery, needle, screws, tamping, O-ring, manual)	1100-0106
AX 100	Extension cable 1m for TFX devices (Lemosa size 0)	1340-5015



## Probes for TFX 410-1 / TFX 420

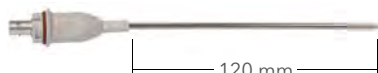
### Pt 1000 Probe (with Lemosa size 0)

The probes of the TFX 410-1 and TFX 420 core thermometers are all changeable - and yet the devices have protection class IP 67, i.e. protection against immersion up to 1m. Even little mishaps like plummeting the device into a bucket of water won't have consequences. The various probes and cables allow for a use in many different applications, e.g. heating of food (PTFE) or in rough and humid environments (silicone).

**TPX 100** blunt probe  
(Needle length = 120 mm, Ø 3 mm, blunt, stainless steel needle, up to +400 °C)



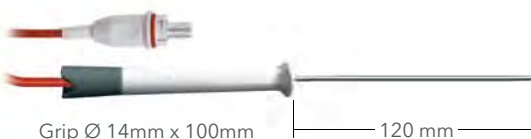
**TPX 200** pointed probe  
(Needle length = 120 mm, Ø 3 mm, pointed, stainless steel needle, up to +400 °C)



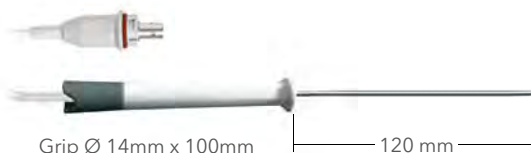
**TPX 300** glass-coated probe  
(Needle length = 190 mm, Ø 8 mm, glass-coated, stainless steel needle, up to +400 °C)



**TPX 400** pointed probe  
(Needle length = 120 mm, Ø 3 mm, pointed, with 60 cm silicone cable, stainless steel needle, up to +400 °C)



**TPX 440** pointed probe  
(Needle length = 120 mm, Ø 3 mm, with 150 cm PTFE cable, stainless steel needle, up to +400 °C)



### Technical Data

Accuracy Exceeds DIN IEC 584, class 1



TF 410 - still working, thanks to IP 67

Type	Description	Part No.
TPX 100	Blunt probe, needle length = 120mm, Ø 3 mm, without cable	1341-5417
TPX 200	Pointed probe, needle length = 120 mm, Ø 3 mm, without cable	1341-5418
TPX 200-20	Pointed probe, needle length = 200 mm, Ø 3 mm, without cable	1341-4182
TPX 200-30	Pointed probe, needle length = 300 mm, Ø 3 mm, without cable	1341-4183
TPX 200-40	Pointed probe, needle length = 400 mm, Ø 3 mm, without cable	1341-4184
TPX 300	Glass-coated probe, needle length = 120 mm, Ø 8 mm, without cable	1341-5419
TPX 400	Pointed probe with 60 cm silicone cable (red) and grip, needle length = 120 mm, Ø 3 mm	1341-5416
TPX 400-40	Pointed probe with 40 cm silicone cable (red) and grip, needle length = 120 mm, Ø 3 mm	1341-4164
TPX 400-150	Pointed probe with 150 cm silicone cable (red) and grip, L = 120 mm, Ø 3 mm	1341-4168
TPX 440	Pointed probe with 150 cm PTFE cable (white) and grip, L = 120 mm, Ø 3mm	1341-4169

## GFX 460 Series **Electronic Contact Thermometers**



GFX 460



GFX 460 G



GFX 460 B

### General Technical Specifications

Measurement range	-50 °C ... +300 °C (-58 °F ... +572 °F)
Resolution	1 °C
Measurement accuracy	±1 °C
Measurement interval	1 sec
Operating temperature	-5 °C ... +60 °C
Storage temperature	-30 °C ... +70 °C
Regulation	Fuzzy regulation
Security features	<ul style="list-style-type: none"> <li>• Identification of probe breakage</li> <li>• Identification of probe access</li> <li>• Security and regulation cycle according to DIN 12878 class 1 / 2</li> </ul>
Access	DIN 45322 Diode plug, 5-pole
Other options	Green display background lighting
Protection class	IP 65

### GFX 460 **Electronic Contact Thermometer** with fixed stainless steel Pt 1000 probe



- Fuzzy control
- Control loop according to DIN EN 12878 class 1 and 2
- Green display background light

### Technical Data

Probe	Pt 1000, permanently attached
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Type	Description	Part No.
GFX 460	Electronic contact thermometer with fixed stainless steel Pt 1000 probe, L = 205 mm, Ø 3 mm, cable length 70 cm	1340-5460

## GFX 460 G Electronic Contact Thermometer with fixed glass-coated Pt 1000 probe



- Fuzzy control
- Control loop according to DIN EN 12878 class 1 and 2
- Green display background light

### Technical Data

Probe	Pt 1000, glass-coated, permanently attached
-------	---

Type	Description	Part No.
GFX 460 G	Electronic contact thermometer with glass coated probe, L = 235 mm, Ø 7 mm, cable length 70 cm	1340-5462

## GFX 460 B Electronic Contact Thermometer for replaceable Pt 100 probes



- Fuzzy control
- Control loop according to DIN EN 12878 class 1 and 2
- Green display background light

### Technical Data

Probe	Pt 100, exchangeable
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Type	Description	Part No.
GFX 460 B	Electronic contact thermometer without probe	1340-5464

## Accessories for GFX 460 Series



AG 151 Stand adapter



AX 110 Extension cable for GFX 460 B only



AX 400 Relay box

Type	Description	Part No.
AG 151	Stand bracket	1340-5001
AX 110	Extension cable for GFX 460 B, xilicone cable, L = 1 m	1340-5020
AX 400	Relay box	1340-0157

## External Probes for GFX 460 B

### Pt 100, 4 conductors class A, Lemo size 1

**TPX 130** blunt probe  
(Needle length = 200 mm,  
Ø 3 mm, stainless steel needle,  
up to +400 °C)



GFX 460 B + TPX 130

**TPX 230** pointed probe  
(Needle length = 200 mm,  
Ø 3 mm, stainless steel needle,  
up to +400 °C)



GFX 460 B + TPX 230

**TPX 330** blunt, glass coated  
probe  
(Needle length = 190 mm,  
Ø 8 mm, stainless steel needle,  
up to +400 °C)



GFX 460 B + TPX 330



#### Technical Data

Accuracy Pt 100, 4 conductors class A, size 1

Type	Description	Part No.
TPX 130	Blunt probe, needle length = 200 mm, Ø 3 mm	1341-5437
TPX 230	Pointed probe, needle length = 200 mm, Ø 3 mm	1341-5438
TPX 330	Blunt, glass coated probe, needle length = 190 mm, Ø 8 mm	1341-5439

## TFN-520/530 Series 1-/2-Channel-Thermometers



#### General Technical Specifications

Measurement range type K	-200 °C ... +1200 °C (-328 °F ... +2192 °F)
Measurement range type J	-100 °C ... +800 °C (-148 °F ... +1472 °F)
Measurement range type T	-100 °C ... +300 °C (-148 °F ... +572 °F)
Measurement range type E	-100 °C ... +600 °C (-148 °F ... +1112 °F)
Accuracy at +25 °C, type K	±0.3 °C (-99.9 °C ... +250 °C)
Accuracy at +25 °C, type J	±0.3 °C (-50 °C ... +190 °C)
Accuracy at +25 °C, type T	±0.3 °C (-50 °C ... +220 °C)
Accuracy at +25 °C, type E	±0.3 °C (-50 °C ... +150 °C) ±0.5 % for the remaining measurement range
Resolution type K	0.1 °C (-99.9 °C ... +250 °C), 1 °C for the remaining measurement range
Resolution type J	0.1 °C (-99.9 °C ... +190 °C), 1 °C for the remaining measurement range
Resolution type T	0.1 °C (-99.9 °C ... +220 °C), 1 °C for the remaining measurement range
Resolution type E	0.1 °C (-99.9 °C ... +150 °C), 1 °C for the remaining measurement range
Operating temperature	-5 °C ... +50 °C
Storage temperature	-25 °C ... +60 °C
Sampling rate	0.5 sec ... 15 sec
Sensor	External; Thermocouple type K, J, T, E
Battery	Lithium, 3V
Battery lifetime	5 years
Dimensions (l x w x h)	115 x 54 x 22 mm
Weight	Approximately 90 g
Housing material	ABS

### TFN 520 Type K, J, T, E Thermometer 1-channel high accuracy thermocouple thermometer



Please find probe variants starting on page 122.

- With Lemo connection
- Robust design for years of industrial use
- Approximately 5 year battery life time

#### Technical Data

Sensor connection	LEMO size 0
Channels	1 external (sensor/channel...)
Protection class	IP 52

Type	Description	Part No.
TFN 520	1-channel thermometer with Lemo connection	1340-5520

### TFN 520-SMP Type K, J, T, E Thermometer 1-channel high accuracy thermocouple thermometer



Please find probe variants starting on page 122.

- With SMP connection
- Robust design for years of industrial use
- Approximately 5 year battery life time

#### Technical Data

Sensor connection	SMP
Channels	1 external
Protection class	IP 40

Type	Description	Part No.
TFN 520-SMP	1-channel thermometer with SMP connection	1340-5522

### TFN 530 Type K, J, T, E Thermometer 2-channel high accuracy thermocouple thermometer



Please find probe variants starting on page 122.

- With Lemo connections
- Robust design for years of industrial use
- Approximately 5 year battery life time

#### Technical Data

Sensor connection	LEMO size 0
Channels	2 external
Protection class	IP 52

Type	Description	Part No.
TFN 530	2-channel thermometer with Lemo connection	1340-5530

## TFN 530-SMP Type K, J, T, E Thermometer 2-channel high accuracy thermocouple thermometer



Please find probe variants starting on page 122.

- With SMP connections
- Robust design for years of industrial use
- Approximately 5 year battery life time

### Technical Data

Sensor connection	SMP
Channels	2 external
Protection class	IP 40

Type	Description	Part No.
TFN 530-SMP	2-channel thermometer with SMP connection	1340-5532

## Accessories for TFN devices



**AG 120** Synthetic leather case



**AG 170** Battery exchange set



**AG 130** Small case



**AN 150** Large case (without device and accessories)



**AG 140** Protective cover for handheld devices, red



**AN 140** Extension cable, 1 m silicone, Lemo size 0

**AN 143** Extension cable, 2.5m silicone, Lemo size 0



**AN 142** Extension cable, 1m silicone, SMP  
**AN 144** Extension cable, 2.5 m silicone, SMP



**AN 141** Adapter cable, 1m silicone (SMP/Lemo size 0)



**AG 160** Stainless steel bracket



**AG 161** Stainless steel bracket for TFN devices with protective cover AG 140

Type	Description	Part No.
AG 120	Synthetic leather case	1341-0619
AG 130	Small case	1341-3854
AG 140	Protective cover for handheld devices, red	1340-5005
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket for TFN devices in protective cover AG 140 (AG 140 not included)	1340-0596
AG 170	Battery-change set (incl. 3V lithium CR 2477 battery, needle, screws, tamping, O-ring, manual)	1100-0106
AN 140	Extension cable, 1m silicone, Lemo size 0	1341-2626
AN 141	Adapter cable, 1m silicone SMP/Lemo size 0	1341-2629
AN 142	Extension cable, 1m silicone, SMP	1343-2626
AN 143	Extension cable, 2.5m silicone, Lemo size 0	1341-2627
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627
AN 150	Aluminium carrying case for TFN devices and several large sensors	1341-3857

## TTX 120 Type K Thermometer

Basic multi-purpose thermometer



Required accessories:  
NiCr-Ni probe  
(starting on page 122)

- SMP connection
- User replaceable battery
- Measurement range to +1200 °C

### Technical Data

Measurement range type K	-60 °C ... +1.200 °C (-76 °F ... +2192 °F)
Accuracy Type K (at +25 °C)	±1 °C or ±1%, whichever is larger
Resolution	0.1 °C (-60 °C ... +199.9 °C) 1 °C for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Reaction time (t <sub>90</sub> )	Depends on probe
Dimensions (L x W x H)	90 x 42 x 17 mm
Battery	CR 2032, replaceable
Battery lifetime	Typically 100 hours of uninterrupted use
Protection class	IP 40
Connection	SMP
Channel	1
Sensor	Thermocouple, type K
Certificate	Factory calibration certificate

Type	Description	Part No.
TTX 120	Thermometer with SMP connection (without probe)	1340-5120
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627

## TTX 100 Type T Core Thermometer

### Thermocouple thermometer with cable probe



TTX 100

TTX-WM

- Automatic shut off
- Replaceable battery

#### Technical Data

Mesurement range type T	-50 °C ... +350 °C (-58 °F ... +662 °F)
Accuracy type T (at +25 °C)	± 0.8 °C or ±0.8 %, whichever is larger
Resolution	0.1 °C (-60 °C ... +199.9 °C) 1 °C for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Response time (t <sub>90</sub> )	4 sec
Dimensions (L x W x H)	90 x 42 x 17 mm (without probe)
Battery	CR 2032, replaceable
Battery lifetime	Typically 100 hours of uninterrupted use
Temperature probe	Permanently attached to the device, with 60 cm silicone cable, probe with grip, needle Ø 3 mm, L = 105 mm, pointed
Protection class	IP 55

Type	Description	Part No.
TTX 100	Thermometer (Thermocouple type T) with cable	1340-5100
TTX-WM	Wall bracket for TTX 100 and TTX 110	1340-5040
AG 190	Drill for frozen food (picture see page 115)	1341-3834

## TTX 110 Type T Core Thermometer

### Thermocouple thermometer with fixed probe



TTX 110

TTX-WM

- Including needle protection
- Automatic shut off
- Replaceable battery

#### Technical Data

Mesurement range type T	-50 °C ... +350 °C (-58 °F ... +662 °F)
Accuracy type T (at +25 °C)	± 0.8 °C or ±0.8 %, whichever is larger
Resolution	0.1 °C (-60 °C ... +199.9 °C) 1 °C for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Response time (t <sub>90</sub> )	4 sec
Dimensions (L x W x H)	90 x 42 x 17 mm (ohne Fühler)
Battery	CR 2032, replaceable
Battery lifetime	Typically 100 hours of uninterrupted use
Temperature probe	Permanently attached to the device, needle Ø 3 mm, L = 90 mm, pointed
Protection class	IP 55

Type	Description	Part No.
TTX 110	Thermometer (Thermocouple type T) with fixed probe, including needle protection	1340-5110
TTX-WM	Wall bracket for TTX 100 and TTX 110	1340-5040
AG 190	Drill for frozen food (picture see page 115)	1341-3834



## TDC 110 Basic Core Thermometer with spare battery



### Technical Data

Measurement range	-50 °C ... +150 °C (-58 °F ... +302 °F)
Resolution	0.1 °C
Measurement accuracy	± 1 °C (-10 °C ... +120 °C), ± 2 °C for the remaining measurement range
Sensor	NTC
Probe needle	Stainless steel, Ø4 mm, L = 120 mm, pointed
Response time (t <sub>99</sub> )	19 sec (water)
Operating temperature	0 °C ... +50 °C
Storage temperature	-10 °C ... +60 °C
Display	7 mm LCD
Battery	1.5 V, G 10-A
Dimensions (L x W)	50 x 40 mm; needle length = 120 mm
Weight	Approximately 13 g

- Automatic shut off after approximately 10 minutes
- Including needle guard

Type	Description	Part No.
TDC 110	Low-Cost Thermometer, incl. needle protection and spare battery	1340-5121
AG 190	Drill for frozen food (picture see page 115)	1341-3834

## TDC 150 Basic Core Thermometer with handy housing



### Technical Data

Measurement range	-50 °C ... +150 °C (-58 °F ... +302 °F)
Resolution	0.1 °C (-20 °C ... + 150 °C)
Measurement accuracy	± 1 °C (-30 °C ... +150 °C )
Sensor	NTC
Probe	Stainless steel, Ø 3,5 mm, L = 125 mm, pointed
Response time (t <sub>99</sub> )	10 sec (water)
Operating temperature	0 °C ... + 50 °C
Storage temperature	-10 °C ... + 60 °C
Display	LCD-7 mm
Battery	1.5 V LR44, G13
Battery lifetime	Approximately 5.000 h
Dimensions (L x W x H)	24 x 26 x 85 mm
Housing material	ABS

- Approximately 5000 hours battery lifetime
- Waterproof housing (IP 65)
- Including needle protection

Type	Description	Part No.
TDC 150	Thermometer, incl. needle protection	1340-1611
AG 190	Drill for frozen food (picture see page 115)	1341-3834

## Fold-Back Thermometers

On the next pages you will find various fold-back thermometers with and without infrared measurement technology. The penetration probe is foldable for a secure and convenient storage of the measurement device.



## Applications

- Core temperature measurement
- Surface temperature measurement with infrared
- Temperature measurement of fluids
- Environmental temperature measurement
- Process monitoring

## Find your perfect fold-back thermometer:

Fold-Back Thermometers	Measurement range	High accuracy	Probe type	Channels	Fast response time	Waterproof housing
TLC 700 Basic Fold-Back Thermometer	-30 °C ... +220 °C		NTC	1		<b>x</b>
TLC 730 Dual Infrared/ Fold-Back Thermometer	-50 °C ... +350 °C		Infrared and thermocouple type K	2	<b>x</b> (Infrared)	<b>x</b>
TLC 1598 Precision Fold-Back Thermometer	-50 °C ... +200 °C	<b>x</b>	Pt 1000	1		

## TLC 730 Dual Infrared/Fold-Back Thermometer with foldable penetration probe and infrared sensor



The device has been certified together with the EB 4401 food inspection case (please see page 161).

- Double laser pointer
- Including drill for the measurement of frozen food
- Visible and audible alarm upon exceeding/shortfall of limit value

### Technical Data

Measurement range	-50 °C ... +350 °C (-58 °F ... 662 °F)
Accuracy infrared	±4 °C at -50 °C ... -30.1 °C (±7.2 °F at -58 °F ... -22 °F) ±2.5 °C at -30 °C ... -18.1 °C (±4.5 °F at -22 °F ... -0.4 °F) ±1.5 °C at -18 °C ... -0.1 °C (±2.7 °F at -0.4 °F ... 32 °F) ±1.0 °C at 0 °C ... +65 °C (±1.8 °F at 32 °F ... 149 °F) ±2.0 °C or 2 % at +65 °C ... +350 °C (±3.6 °F at 149 °F ... 662 °F)
Accuracy penetration probe	±0.5 °C at -18 °C ... +120 °C (±0.9 °F at -0.4 °F ... 248 °F) ±1 °C (±2 °F) or 1 % for the remaining measurement range (whichever is larger)
Resolution	0.1 °C / 0.2 °F
Sensor	Thermocouple type K
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Battery	2 x AAA (Micro), user replaceable
Battery lifetime	Approximately 15 h of continuous use
Dimensions (L x W x H)	48 x 24 x 172 mm (without probe), needle length = 100 mm
Housing material	ABS
Weight	Approximately 140 g
Protection class	IP 55
Automatic deactivation	Automatically after 15 seconds, deactivatable
Certificate	Factory calibration certificate

Type	Description	Part No.
TLC 730	Dual Infrared / Fold-Back Thermometer	1340-5730

## TLC 1598 Precision Fold-Back Thermometer with foldable Pt 1000 penetration probe and high accuracy



- High accuracy of ±0.3 °C
- Short response time
- Approximately 4 years battery life time

### Technical Data

Measurement range	-50 °C ... +200 °C (-58 °F ... 392 °F)
Accuracy	±0.3 °C (±0.5 °F)
Resolution	0.1 °C (0.2 °F)
Sensor	Pt 1000
Response time (t <sub>99</sub> )	8 s (water)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-10 °C ... +60 °C (14 °F ... 140 °F)
Display	LCD 9 mm
Battery	3.6 V lithium
Battery lifetime	Approximately 4 years
Dimensions (L x W x H)	44 x 18 x 158 mm, L = 105 mm
Housing material	ABS
Weight	Approximately 70 g
Protection class	IP 54
Certificate	3-point factory calibration

Type	Description	Part No.
TLC 1598	Precision Fold-Back Thermometer	1340-1620

TLC 700 **Basic Fold-Back Thermometer**  
with foldable penetration probe



- Small size easily fits in a pocket
- Waterproof housing (IP 65)
- Color ring can be changed in order to assign the device to a person, department or application

**Technical Data**

Temperature measurement range	-30 °C ... +220 °C (-22 °F ... +428 °F)
Accuracy	±0.5 °C (at -30 °C ... +100 °C), ±1.0 % for the remaining measurement range
Resolution	0.1 °C
Operating temperature	-25 °C ... +50 °C (-13 °F ... +122 °F)
Battery	Lithium button cell (CR 2032)
Dimensions (L x W x H)	118 x 33 x 15 mm, needle length = 70 mm
Certificate	Factory calibration certificate

Type	Description	Part No.
TLC 700	Folding Thermometer	1340-5735

Accessories for Folding Thermometers



**AG 700** Color ring change set



**AG 190** Drill for frozen food for TLC 730

Type	Description	Part No.
AG 121	Nylon bag for TLC 1598	1341-0624
AG 190	Drill for frozen food for TLC 700, TLC 730 and TLC 1598	1341-3834
AG 700	Color ring change set for TLC 700	1341-5735

## Infrared Thermometers

On the next pages you will find various infrared thermometers for non-contact surface temperature measurements. The infrared thermometers are suitable for measurements wherever direct contact is impossible or impractical. ebro also offers models that measure not only the surface temperature but also the relative humidity or the core temperature by means of an external probe.



## Applications

- Surface temperature measurement
- Core temperature measurement with penetration probe
- Humidity measurement
- Process monitoring

## Find your perfect infrared thermometer:

Infrared Thermometers	Measurement range	Probe type	Probe connection	Channels	Distance:spot ratio	Fast response time	Splashproof housing
TFI 54 Infrared Thermometer	-60 °C ... +550 °C	Infrared		1	12:1	✗	✗
TFI 250 Basic Infrared Thermometer	-60 °C ... +550 °C	Infrared		1	12:1	✗	
TFI 550 Infrared Dual Thermometer	-60 °C ... +550 °C	Infrared and Thermoelement Typ K	SMP	2	30:1	✗ (Infrared)	
TFI 650 Infrared Dual Thermometer	-60 °C ... +1500 °C	Infrared and Thermoelement Typ K	SMP	2	50:1	✗ (Infrared)	
THI 350 Infrared Thermometer/Hygrometer	-60 °C ... +500 °C	Infrared (temperature and humidity)		2	12:1	✗	
TLC 730 Dual Infrared/Fold-Back Thermometer	-50 °C ... +350 °C	Infrared and thermocouple type K		2	8:1	✗ (Infrared)	✗

## TFI 650 Infrared Dual Thermometer

with wide measurement range and connection for thermo elements type K



Optional external NiCr-Ni probes with SMP connection available (starting on page 122).

- Double laser pointer
- Distance:spot ratio = 50:1
- Alarm when MIN/MAX exceeded

### Technical Data

Measurement range	-60 °C ... +1500 °C (-76 °F ... +2732 °F)
Accuracy	±2% of measurement value / ±2 °C (whichever is larger)
Resolution	0.1 °C
Response time	Approximately 1 sec
Emissivity factor	0.1 ... 1.0
Distance:spot ratio	50:1
Probe	With SMP connection
Operating temperature	0 °C ... +50 °C
Storage temperature	-20 °C ... +65 °C
Housing material	ABS
Protection class	IP 20
Battery	2 x AAA (Micro)
Battery lifetime	Typically 140 hours
Dimensions (L x W x H)	47 x 197 x 203.3 mm
Weight	Approximately 385 g (with battery)
Certificate	Factory calibration certificate

Type	Description	Part No.
TFI 650	Infrared Thermometer with NiCr-Ni connection	1340-1783
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627

## TFI 550 Infrared Dual Thermometer

with connection for thermo elements type K



Optional external NiCr-Ni probes with SMP connection available (starting on page 122).

- Double laser pointer
- Distance:spot ratio = 30:1
- Alarm when MIN/MAX exceeded

### Technical Data

Measurement range	-60 °C ... +550 °C (-76 °F ... 1022 °F)
Accuracy	±2 °C at -18 °C ... +23 °C (±3.6 °F at 0 °F ... 73 °F) ±1 % of measurement ±1 °C (whichever is larger) at +23 °C ... +510 °C ±1.8 °F (whichever is larger) at 73 °F ... 950 °F
Resolution	0.1 °C at -9.9 °C ... +199 °C, otherwise 1 °C (0.2 °F at 14 °F ... 391 °F, otherwise 1.8 °F)
Response time (t <sub>99</sub> )	Approximately 1 s
Emissivity factor	0.1 ... 1.0
Distance : spot ratio	30:1

### NiCr-Ni probe measurement

Measurement range	-64 °C ... +1400 °C (-83 °F ... 2552 °F)
Connection	SMP
Accuracy	±1 % of measurement value / ±1 °C (±1.8 °F), whichever is larger
Battery	2 x AAA (Micro)
Battery lifetime	Typically 180 hours
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-20° C ... +65 °C (-4 °F ... 149 °F)
Housing material	ABS
Protection class	IP 20
Weight	Approximately 180 g
Certificate	Factory calibration certificate

Type	Description	Part No.
TFI 550	Infrared thermometer with NiCr-Ni connection	1340-1786
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627



## TFI 250 Basic Infrared Thermometer with adjustable emissivity factors



### Technical Data

Measurement range	-60 °C ... +550 °C (-76 °F... 1022 °F)
Accuracy	±2 °C + 0,05 °C per °C below 0 °C (at -60 °C ... 0 °C) ±2 °C (at 0 °C ... +15 °C) ±1,5 °C (at +15 °C ... +35 °C) ±2 °C or 2%, larger value is applicable (at +35 °C ... +550 °C)
Resolution	0.1 °
Operating temperature	0 °C ... +50 °C (+32 °F ... 122 °F)
Response time	1 s
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Distance : spot ratio	12:1
Battery	2 x AAA (Micro)
Battery lifetime	Approximately 14 hours of continuous use
Housing material	ABS
Dimensions (L x W x H)	153 x 115 x 48 mm
Weight	177 g (with batteries)
Protection class	IP 20
Certificate	Factory calibration certificate

- Single laser pointer
- Distance:spot ratio = 12:1
- Replaceable battery

Type	Description	Part No.
TFI 250	Infrared Thermometer including factory calibration certificate	1340-1753

## TFI 54 Infrared Thermometer with splash proof housing



### Technical Data

Measurement range	-60 °C ... +550 °C (-76 °F ... +1022 °F)
Accuracy	±2 °C + 0,05 °C per °C below 0 °C (at -60 °C ... 0 °C) ±2 °C (at 0 °C ... +15 °C) ±1,5 °C (at +15 °C ... +35 °C) ±2 °C or 2%, larger value is applicable (at +35 °C ... +550 °C)
Resolution	0.1 °C (-9.9 °C ... +199.9 °C) 1 °C for the remaining measurement range
Operating temperature	0 °C ... +50 °C (+32 °F ... +122 °F)
Response time	1 s
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Distance : spot ratio	12:1
Battery	2 x AAA (Micro)
Battery life time	Approximately 14 hours of continuous use
Housing material	Rubberized
Dimensions (L x W x H)	144 x 117 x 43 mm
Weight	180 g (with batteries)
Protection class	IP 54
Certificate	Factory calibration certificate

- Single laser pointer
- Distance:spot ratio = 12:1
- Replaceable battery

Type	Description	Part No.
TFI 54	Infrared Thermometer including factory calibration certificate	1340-1754

## THI 350 Infrared Thermometer/Hygrometer with automatic dew point calculation



- Visible and audible alarm upon exceeding of user settable limits
- Distance:spot ratio = 12:1

### Technical Data

Measurement range	-60 °C ... +500 °C (-76 °F... 932 °F)
Temperature accuracy	±1.0 °C (+15 °C ... + 35 °C), ±2 °C (-33 °C ... 500 °C), ±2 °C for the remaining measurement range
Measurement range: Relative air humidity	1 % ... 99 %
Accuracy: Relative air humidity (Tamb = 23±5degC)	±3 % (20 % ... 80 %), ±5 % for the remaining measurement range
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Resolution (-9,9~199,9 °C)	0.1 °C / 0.1 °F
Response time	1 sec
Operating Temperature	0 °C to +50 °C (+32 °F to +122 °F)
Distance:Spot ratio	12:1
Measurement range relative air humidity (Tamb = 23 ± 5degC)	1~99 %, Accuracy: ± 3 % of 20~80 %, otherwise ± 5 %
Dew point	-50~50 °C, Accuracy: ±2.5 °C of 20~30 % rH; ±2 °C of 31~40 % rH; ±1,5 °C of 41~95 rH
Battery	2 x AAA Micro (Alkaline recommended)
Battery lifetime	Typically 180 h, at least 140 h of continuous use
Protection class	IP 20
Dimensions (L x W x H)	46 x 143 x 184.8 mm
Certificate	Factory calibration certificate

Type	Description	Part No.
THI 350	Infrared thermometer with air humidity measurement	1340-1790

## TLC 730 Dual Infrared/Fold-Back Thermometer with foldable penetration probe and infrared sensor



- Double laser pointer
- Distance:spot ratio = 8:1
- Visible and audible alarm upon exceeding/shortfall of limit value

### Technical Data

Measurement range	-50 °C ... +350 °C (-58 °F ... 662 °F)
Accuracy infrared	±4 °C at -50 °C ... -30.1 °C (±7.2 °F at -58 °F ... -22 °F) ±2.5 °C at -30 °C ... -18.1 °C (±4.5 °F at -22 °F ... -0.4 °F) ±1.5 °C at -18 °C ... -0.1 °C (±2.7 °F at -0.4 °F ... 32 °F) ±1.0 °C at 0 °C ... +65 °C (±1.8 °F at 32 °F ... 149 °F) ±2.0 °C or 2 % at +65 °C ... +350 °C (±3.6 °F at 149 °F ... 662 °F)
Accuracy penetration probe	±0.5 °C at -18 °C ... +120 °C (±0.9 °F at -0.4 °F ... 248 °F) ±1 °C (±2 °F) or 1 % for the remaining measurement range (whichever is larger)
Resolution	0.1 °C / 0.2 °F
Sensor	Thermocouple type K
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Battery	2 x AAA (Micro), user replaceable
Battery lifetime	Approximately 15 h of continuous use
Dimensions (L x W x H)	48 x 24 x 172 mm (without probe)
Housing material	ABS
Weight	Approximately 140 g
Protection class	IP 65
Automatic deactivation	Automatically after 15 seconds, deactivatable
Certificate	Factory calibration certificate

Type	Description	Part No.
TLC 730	Dual Infrared / Fold-Back Thermometer	1340-5730

# Recommendations for Infrared Measurements

## Infrared Radiation Properties of Various Materials

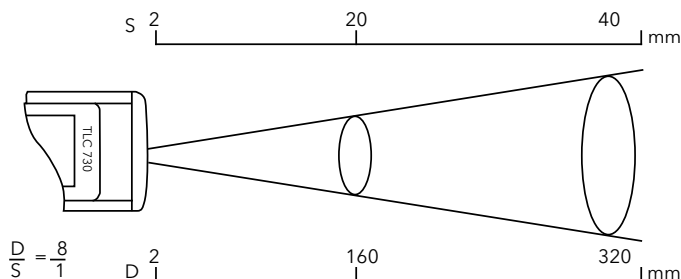
Various materials and surfaces have different infrared light emitting properties and therefore affect the temperature data being measured (emissivity). Most common products (including liquids and foodstuffs packaged in cartons or plastic containers) have an emissivity of 0.95.

Bare or metallic surfaces cause inaccurate measurements due to their reflectivity of light and heat radiation. It is possible to circumvent these problems by measuring parts of the object you are measuring that are already black (e.g. for a grill) or by painting the surface of the respective object black or by covering with matt tape. After covering the object, wait some time before performing the measurement to ensure that the material used for covering can acquire the temperature of the object being measured.

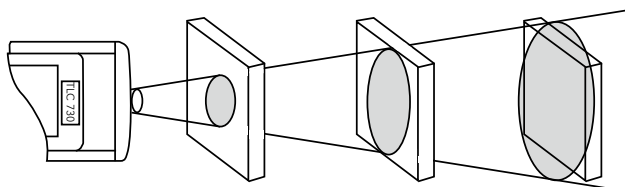
Our thermometers have a factory set emissivity of 0.95. The emissivity value can be set within a range of 0.10 (value shown on display: 10E) and 1 (display: 100E).

## Tips for Precise Infrared Measurements

As the distance between the thermometer and the object being measured increases, so does the diameter of the surface being measured (spot size). You can observe this because the distance between the two red laser points projected on the measured object increases as the distance between the thermometer and the measured object increases. The ideal measuring distance is between 5 cm and 10 cm.



Please ensure that the object being measured is larger than the distance between the two laser points. The smaller the measured object is, the closer you must be to the object.



If the accuracy of the measurement is crucial, the object being measured should be at least twice as large as the distance between the two laser points. The device is not well-suited for taking temperature measurements on shiny or highly polished metallic surfaces (e.g. stainless steel, aluminum etc.). The device cannot take measurements through transparent surfaces such as glass. The device will instead measure the surface temperature of the glass. Steam, dust, smoke and other obstructions can interfere with measuring the correct temperature. If you would like to measure liquids, stir up the liquid thoroughly while taking the measurement.

**Table of certain known emissivities**

Material Emissivity	Emission 8-14 $\mu\text{m}$
Aluminium, oxidised	0.2 - 0.4
Aluminium, blank	0.04
Lead, scraggly	0.4
Lead, oxidised	0.2 - 0.6
Iron, oxidised	0.5 - 0.9
Iron, polished	0.24
Iron, rusted	0.5 - 0.7
Copper, polished	0.03
Copper, oxidised	0.4 - 0.8
Inconel, oxidised	0.7 - 0.95
Inconel, polished	0.3 - 0.6
Asphalt	0.95
Concrete	0.95
Ice	0.98
Cement	0.8 - 0.95
Glass pane	0.85
Rubber	0.95
Limestone	0.98
Wood	0.9 - 0.95
Cork	0.7
Graphite	0.7 - 0.8
Ceramics	0.95
Gravel	0.95
Paper	0.95
Cloth	0.95
Sand	0.9
Snow	0.9
Potter's clay	0.95
Water	0.93

## Exchangeable Thermocouple Probes

To solve each of your measurement tasks perfectly, you can choose between various probe types:

- Low-cost probes
- Rod probes
- Surface probes
- High temperature probes
- Other probes

The probes are available with Lemo and/or SMP connection.  
All probes are thermo element type K (NiCrNi)



## Find your perfect probe on the next pages

For each application, ebro provides the right thermometer and also offers a wide selection of precise and robust probes for the following thermometers:

Instrument		SMP-connector	Lemo-connector
TTX 120	(see page 109)	X	
TFN 520	(starting on page 107)	X	X
TFN 530	(starting on page 107)	X	X
TFI 550	(see page 118)	X	
TFI 650	(see page 118)	X	
EBI 40-TC-01	(see page 69)	X	
EBI 40-TC-02	(see page 69)	X	

## Extension cables for probes



**AN 140** Extension cable, 1 m silicone with Lemo connection



**AN 142** Extension cable, 1 m silicone, SMP



**AN 141** Adapter cable, 1 m silicone (Lemo/SMP)

**AN 144** Extension cable, 2.5 m silicone, SMP



**AN 143** Extension cable, 2.5 m silicone, Lemo

Type	Description	Part No.
AN 140	Extension cable, 1m silicone, Lemo	1341-2626
AN 141	Adapter cable, 1m silicone (Lemo/SMP)	1341-2629
AN 142	Extension cable, 1m silicone, SMP	1343-2626
AN 143	Extension cable, 2.5m silicone, Lemo	1341-2627
AN 144	Extension cable, 2.5m silicone, SMP	1343-2627

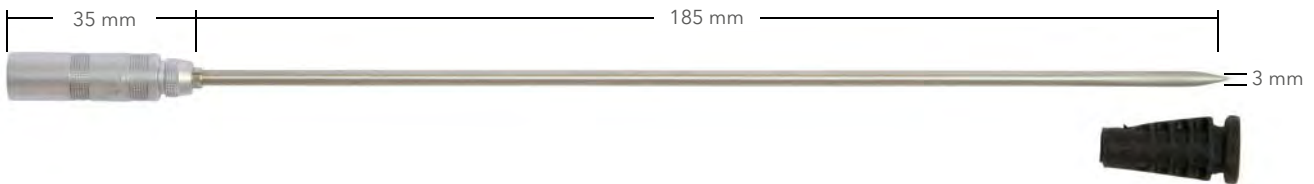
## Low-cost probes

*Temperature measurement of plastic masses, fluids, air and surfaces.*

## Penetration probes

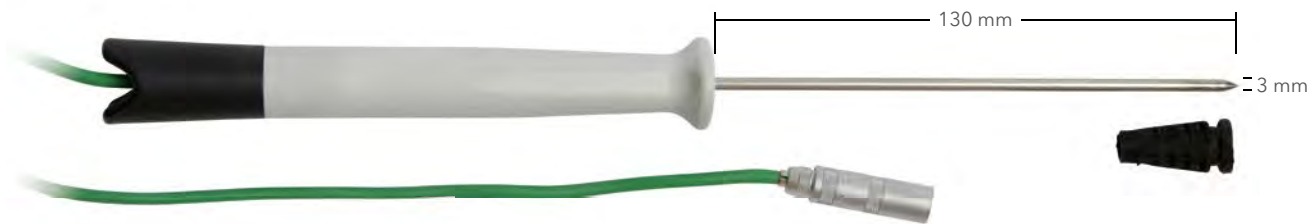
### TPN 200 \*

- Probe (L = 185, Ø 3 mm, pointed, inconel needle with tip, without cable, with Lemo connection)
- Range: -40 °C ... +1100 °C (-40 °F ... +2012 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$ ): 3 sec



### TPN 210 \*

- Probe (L = 130 mm, Ø 3 mm, pointed, stainless steel, up to +400 °C (+752 °F), with 1 m silicone cable, with Lemo connection)
- Range: -40 °C ... +400 °C (-40 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 1



### TPN 211 \*\*

- same as TPN 210 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 200	Penetration probe, L = 185 mm, Ø 3 mm, pointed, Lemo	1341-0608
TPN 210	Penetration probe with 1 m silicone cable, L = 130 mm, Ø 3 mm, pointed, Lemo	1341-1005
TPN 211	Penetration probe with 1 m silicone cable, L = 130 mm, Ø 3 mm, pointed, SMP	1343-1005

## Surface paddle probes

### TPN 340 \*

- Probe (Paddle: 40 x 7 x 0.35 mm, stainless steel sheet, for surfaces up to +400 °C (+752 °F), with 1 m silicone cable, with Lemo connection)
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 2



### TPN 341 \*\*

- same as TPN 340 but with SMP connection



\* for TFN 520 and TFN 530  
 \*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 340	Surface / Paddle probe with 1 m silicone cable, 40 x 7 x 0.35 mm paddle, Lemo	1341-1015
TPN 341	Surface / Paddle probe with 1 m silicone cable, 40 x 7 x 0.35 mm paddle, SMP	1343-1015

## Immersion probes

### TPN 400 \*

- Probe (L = 130 mm, Ø 3 mm, blunt, stainless steel, up to +400 °C (+752 °F), with 1 m silicone cable, with Lemo connection)
- Range: -40 °C ... +400 °C (-40 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 1



### TPN 401 \*\*

- same as TPN 400 but with SMP connection



\* for TFN 520 and TFN 530  
 \*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 400	Immersion probe with 1 m silicone cable, L = 130 mm, Ø 3 mm, blunt, Lemo	1341-1000
TPN 401	Immersion probe with 1 m silicone cable, L = 130 mm, Ø 3 mm, blunt, SMP	1343-1000

## Rod probes

### Basic rod probes

*Temperature measurement of air, ovens, fluids and gases.*

#### TPN 100 \*

- Probe (L = 185 or 300 mm, Ø 0.5 mm, pointed, inconel needle, with Lemo connection)
- Range: -40 °C ... +1100 °C (-40 °F ... +2012 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2m/s): 0.4 sec



#### TPN 110 \*

- Probe (L = 185, 300 or 500 mm, Ø 1 mm, pointed, inconel needle, with Lemo connection)
- Range: -40 °C ... +1100 °C (-40 °F ... +2012 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2m/s): 1sec



#### TPN 111 \*\* same as TPN 110 but

- Probe (L = 185 or 500 mm)
- with SMP connection



#### TPN 120 \*

- Probe (L = 185, 300, 500, 600, 700 or 1000 mm, Ø 1.5 mm, pointed, inconel needle, with Lemo connection)
- Range: -40 °C ... +1100 °C (-40 °F ... +2012 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$  water 0.2 m/s): 2sec



#### TPN 121 \*\* same as TPN 120 but

- Probe (L = 185, 300 or 400 mm)
- with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02



**TPN 140 \***

- Probe (L = 185 or 300 mm, Ø 3 mm, pointed, inconel needle, with Lemo connection)
- Range: -40 °C ... +1100 °C (-40 °F ... +2012 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t<sub>99</sub> water 0.2 m/s): 4 sec



**TPN 141 \*\***

- same as TPN 140 but with SMP connection



\* for TFN 520 and TFN 530  
\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 100	Rod probe without cable, L = 185 mm, Ø 0.5 mm, pointed, Lemo	1341-0611
TPN 100-30	Rod probe without cable, L = 300 mm, Ø 0.5 mm, pointed, Lemo	1341-0805
TPN 110	Rod probe without cable, L = 185 mm, Ø 1 mm, pointed, Lemo	1341-0810
TPN 110-30	Rod probe without cable, L = 300 mm, Ø 1 mm, pointed, Lemo	1341-0812
TPN 110-50	Rod probe without cable, L = 500 mm, Ø 1 mm, pointed, Lemo	1341-0814
TPN 111	Rod probe without cable, L = 185 mm, Ø 1 mm, pointed, SMP	1343-0810
TPN 111-50	Rod probe without cable, L = 500 mm, Ø 1 mm, pointed, SMP	1343-0814
TPN 120	Rod probe without cable, L = 185 mm, Ø 1.5 mm, pointed, Lemo	1341-0609
TPN 120-30	Rod probe without cable, L = 300 mm, Ø 1.5 mm, pointed, Lemo	1341-0400
TPN 120-50	Rod probe without cable, L = 500 mm, Ø 1.5 mm, pointed, Lemo	1341-0406
TPN 120-60	Rod probe without cable, L = 600 mm, Ø 1.5 mm, pointed, Lemo	1341-0409
TPN 120-70	Rod probe without cable, L = 700 mm, Ø 1.5 mm, pointed, Lemo	1341-0412
TPN 120-100	Rod probe without cable, L = 1000 mm, Ø 1.5 mm, pointed, Lemo	1341-0414
TPN 121	Rod probe without cable, L = 185 mm, Ø 1.5 mm, pointed, SMP	1343-0609
TPN 121-30	Rod probe without cable, L = 300 mm, Ø 1.5 mm, pointed, SMP	1343-0400
TPN 121-40	Rod probe without cable, L = 400 mm, Ø 1.5 mm, pointed, SMP	1343-0403
TPN 140	Rod probe without cable, L = 185 mm, Ø 3 mm, pointed, Lemo	1341-0607
TPN 140-30	Rod probe without cable, L = 300 mm, Ø 3 mm, pointed, Lemo	1341-0415
TPN 141	Rod probe without cable, L = 185 mm, Ø 3 mm, pointed, SMP	1343-0607
TPN 141-30	Rod probe without cable, L = 300 mm, Ø 3 mm, pointed, SMP	1343-0415

**Glass coated rod probes**

*Temperature measurement in chemically aggressive stages and fluids (materials reacting with stainless steel).*

**TPN 132-20 \***

- Probe (L = 200, 300 or 400 mm, Ø 8 mm, coated with Duran glass, with Lemo connection)
- Range: -40 °C ... +400 °C (-40 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t<sub>99</sub> water): 40 sec



\* for TFN 520 and TFN 530  
\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 132-20	Rod probe without cable, L = 200 mm, Ø 8 mm, glass-coated, Lemo	1342-0200
TPN 132-30	Rod probe without cable, L = 300 mm, Ø 8 mm, glass-coated, Lemo	1342-0300
TPN 132-40	Rod probe without cable, L = 400 mm, Ø 8 mm, glass-coated, Lemo	1342-0400

## Surface probes

### General purpose surface probes

Surface temperature measurement of motors, turbines, pumps, casting molds, heating tubes, heating plates, injection molding, heating boilers, incinerators etc.

#### TPN 360 \*

- Probe (L = 30mm, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +500 °C (-58 °F ... +932 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t<sub>99</sub>): 1.5 sec



The sensor blade adjusts to the surface

#### TPN 361 \*\*

- same as TPN 360 but with SMP connection



#### TPN 380 \*

- Probe (L = 300mm, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +800 °C (-58 °F ... +1472 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t<sub>99</sub>): 1.5 sec
- Particular suitable for hot surfaces



#### TPN 381 \*\*

- same as TPN 380 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 360	Surface probe with 1m silicone cable, L = 30 mm, up to +500 °C (+932 °F), Lemo	1341-0710
TPN 361	Surface probe with 1m silicone cable, L = 30 mm, up to +500 °C (+932 °F), SMP	1343-0710
TPN 380	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C (+1472 °F), Lemo	1341-0720
TPN 381	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C (+1472 °F), SMP	1343-0720

## Surface probes for sensitive surfaces

Surface temperature measurement of plastic, glass, gum, paper, metal, injection molding, tubes etc. To protect sensitive surfaces, the probe heads consist of PTFE.

### TPN 310 \*

- Probe (Measuring tape: N-version, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +300 °C (-58 °F ... +572 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 1.5 sec
- For highly sensitive surfaces



### TPN 311 \*\*

- same as TPN 310 but with SMP connection



### TPN 320 \*

- Probe (Measuring tape: N-version, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +300 °C (-58 °F ... +572 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 1.5 sec
- For highly sensitive surfaces



### TPN 321 \*\*

- same as TPN 320 but with SMP connection



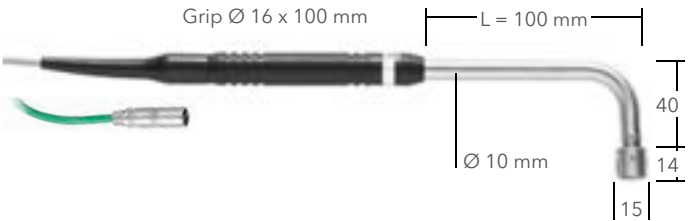
\* for TPN 520 and TPN 530  
 \*\* for TPN 520-SMP, TPN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 310	Surface probe with 1m silicone cable, -50 °C ... +300 °C (-58 °F ... +572 °F), Lemo	1341-0702
TPN 311	Surface probe with 1m silicone cable, -50 °C ... +300 °C (-58 °F ... +572 °F), SMP	1343-0702
TPN 320	Surface probe with 1m silicone cable, -50 °C ... +300 °C (-58 °F ... +572 °F), Lemo	1341-0717
TPN 321	Surface probe with 1m silicone cable, -50 °C ... +300 °C (-58 °F ... +572 °F), SMP	1343-0717

Surface probes for hard to reach surfaces  
Surface temperature measurement of machine parts.

**TPN 350 \***

- Probe (L = 100mm, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +500 °C (-58 °F ... +932 °F)  
Accuracy: exceeds DIN IEC 584, class 1
- Response time (t<sub>99</sub>): 1.5 sec



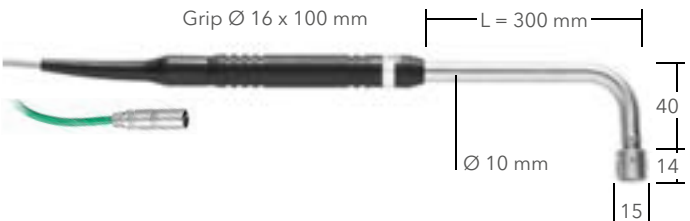
**TPN 351 \*\***

- same as TPN 350 but with SMP connection



**TPN 390 \***

- Probe (L = 300mm, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +800 °C (-58 °F ... +1472 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t<sub>99</sub>): 1.5 sec
- Particularity suitable for hot surfaces



**TPN 391 \*\***

- same as TPN 390 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 350	Surface probe with 1m silicone cable, L = 100 mm, up to +500 °C (+932 °F), Lemo	1341-0712
TPN 351	Surface probe with 1m silicone cable, L = 100 mm, up to +500 °C (+932 °F), SMP	1343-0712
TPN 390	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C (+1472 °F), Lemo	1341-0721
TPN 391	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C (+1472 °F), SMP	1343-0721

## Surface probes with mini sensor

Temperature measurement on very small surfaces like boards, small transformers, small heating blocks, thin tubes, rotors as well as materials such as plastic, glass, gum and metal.

### TPN 330 \*

- Probe (Probe head: Econol, slightly angled, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +250 °C (-58 °F ... +482 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 0.5 sec



### TPN 331 \*\*

- same as TPN 330 but with SMP connection



### TPN 1100 \*

- Probe (Measuring head: Ø 4.2 mm, Measuring tape: coated with polyimid film, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$ ): 2.0 sec



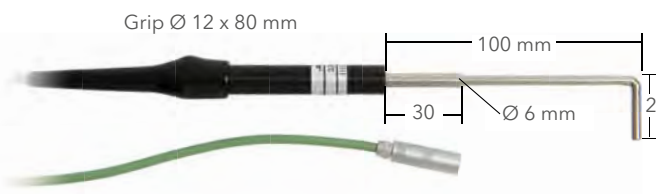
### TPN 1101 \*\*

- same as TPN 1100 but with SMP connection



### TPN 1110 \*

- Probe (Measuring head: Ø 4.2 mm, Measuring tape: coated with polyimid film, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$ ): 2.0 sec



### TPN 1111 \*\*

- same as TPN 1110 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

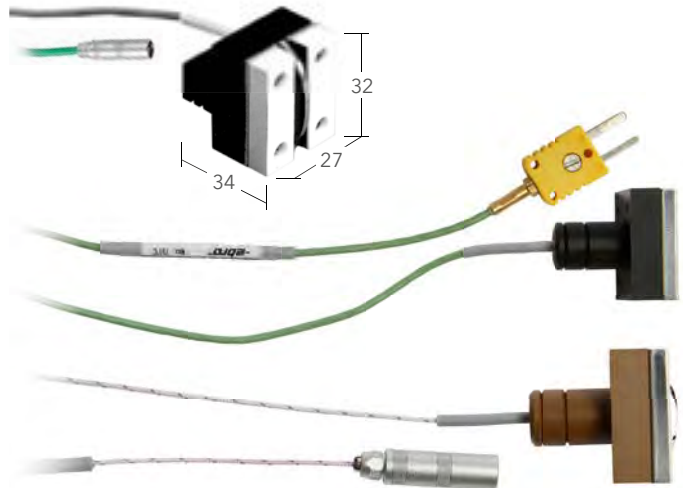
Type	Description	Part No.
TPN 330	Surface probe with 1m silicone cable, 6 x 6 x 20 mm, Lemo	1341-0635
TPN 331	Surface probe with 1m silicone cable, 6 x 6 x 20 mm, SMP	1343-0635
TPN 1100	Mini surface probe with 1m silicone cable, Ø 4.2 mm, up to +400 °C (+752 °F), Lemo	1341-0653
TPN 1101	Mini surface probe with 1m silicone cable, Ø 4.2 mm, up to +400 °C (+752 °F), SMP	1343-0653
TPN 1110	Mini surface probe with 1m silicone cable, Ø 4.2 mm, up to +400 °C (+752 °F), Lemo	1341-0654
TPN 1111	Mini surface probe with 1m silicone cable, Ø 4.2 mm, up to +400 °C (+752 °F), SMP	1343-0654

## Magnetic surface probes

Surface temperature measurement on an extended period of ferrous containing compounds, e.g. heating plates, heating tubes, pumps, flushing tools, motors, turbines etc.

### TPN 900 \*

- Probe (Contact area: 27 x 32 mm, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +250 °C (-58 °F ... +482 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 2.0 sec
- Contact pressure: by magnetic force



### TPN 901 \*\*

- same as TPN 900 but with SMP connection

### TPN 920 \*

- same as TPN 900 but with 1m glasscoated cable
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)

### TPN 910 \*

- Probe (Contact area: 13 x 14 mm, Thermocouple polyimid coated, with 1m glasscoated cable, with Lemo connection)
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 2.0 sec
- Contact pressure: by magnetic force



### TPN 911 \*\*

- same as TPN 910 but with SMP connection

### TPN 912 \*

- same as TPN 910 but with 1m silicone cable
- Range: -50 °C ... +250 °C (-58 °F ... +482 °F)
- thermo element coated with PTFE



### TPN 913 \*\*

- same as TPN 912 but with SMP connection

\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

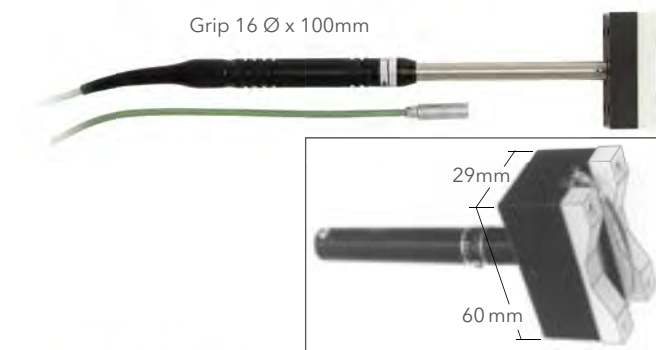
Type	Description	Part No.
TPN 900	Magnetic surface probe with 1 m silicone cable, 27 x 32 mm, up to +250 °C (+482 °F), Lemo	1341-0640
TPN 901	Magnetic surface probe with 1 m silicone cable, 27 x 32 mm, up to +250 °C (+482 °F), SMP	1343-0640
TPN 910	Magnetic surface probe, with 1 m glasscoated cable, 13 x 14 mm, up to +400 °C (+752 °F), Lemo	1341-0641
TPN 911	Magnetic surface probe, with 1 m glasscoated cable, 13 x 14 mm, up to +400 °C (+752 °F), SMP	1343-0641
TPN 912	Magnetic surface probe, with 1 m silicone cable, 13 x 14 mm, up to +250 °C (+482 °F), Lemo	1341-0644
TPN 913	Magnetic surface probe, with 1 m silicone cable, 13 x 14 mm, up to +250 °C (+482 °F), SMP	1343-0644
TPN 920	Magnetic surface probe with 1 m glasscoated cable, 27 x 32 mm, up to +400 °C (+752 °F), Lemo	1341-0645

## Roller surface probes

Temperature measurement of solid, moving and rotating surfaces, such as turned parts, rollers, metal and paper blanks as well as at mold design and construction.

### TPN 700 \*

- Probe (Measuring head with PTFE runners (29 x 60 mm) (for rollers Ø 400 mm to flat), with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +250 °C (-58 °F ... +482 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 3.0 sec
- Max. speed: 800m/min



### TPN 701 \*\*

- same as TPN 700 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 700	Roller probe with 1 m silicone cable, 29 x 60 mm PTFE runners, Ø 400 mm to flat, Lemo	1341-0845
TPN 701	Roller probe with 1 m silicone cable, 29 x 60 mm PTFE runners, Ø 400 mm to flat, SMP	1343-0845

## Sheet surface probes

Temperature measurement in stacked goods, such as wood, paper, ironing presses etc.

### TPN 1010 \*

- Probe (Sheet length: 100 mm, Sheet thickness: 0.05mm at the measuring surface, with 1m silicone cable, with Lemo connection)
- Range: -50 °C.....+210 °C (-58 °F ... +410 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 2.5 sec



### TPN 1011 \*\*

- same as TPN 1010 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

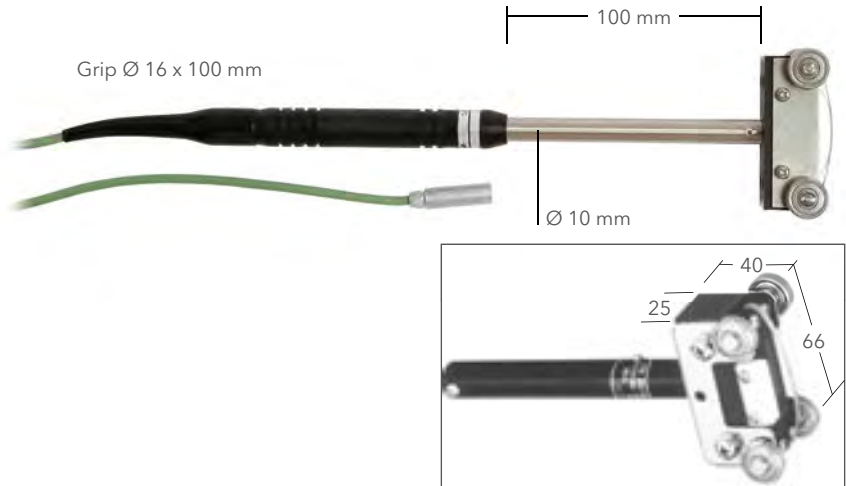
Type	Description	Part No.
TPN 1010	Sheet probe with 1 m silicone cable, up to +210 °C (+410 °F), Lemo	1341-0652
TPN 1011	Sheet probe with 1 m silicone cable, up to +210 °C (+410 °F), SMP	1343-0652

## Rail surface probes

Temperature measurement of moving surfaces.

### TPN 800 \*

- Probe (Measuring head: (25 x 66 mm) with rollers, with 1m silicone cable, with Lemo connection)
- Range: -50 °C ... +200 °C (-58 °F ... +392 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 3 sec
- Max. speed: 500 m/min



### TPN 801 \*\*

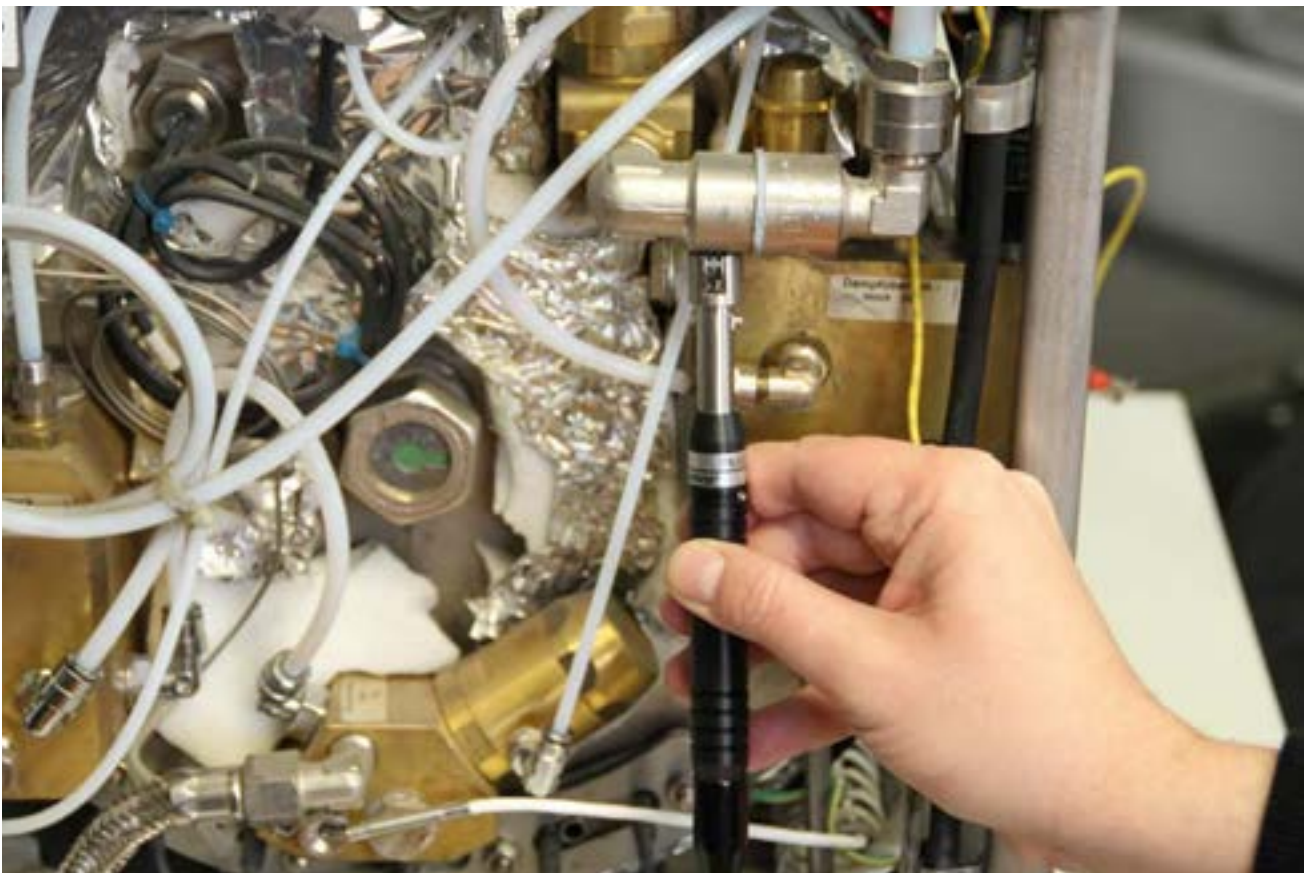
- same as TPN 800 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 800	Rail probe with rollers and 1 m silicone cable, 25 x 66 mm measuring head, Lemo	1341-0639
TPN 801	Rail probe with rollers and 1 m silicone cable, 25 x 66 mm measuring head, SMP	1343-0639





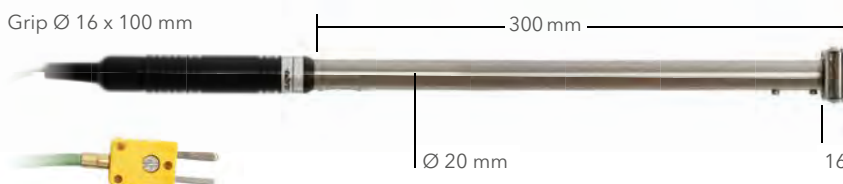
## High temperature probes

### Basic high temperature probes

Temperature measurement on ingots (glowing metal blocks with high thermal capacity).

#### TPN 1201 \*\*

- Probe (Probe element: protected by stainless steel, with 1 m silicone cable, with SMP connection)
- Range: -50 °C.....+1200 °C (-58 °F ... +2192 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$ ): 15 sec
- Contact area: 36 x 34mm



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 1201	High-temperature probe with 1 m silicone cable, up to +1200 °C, SMP	1343-0678

### Flexible high temperature probes

High temperature measurement of air and gases.

#### TPN 1220 \*

- Probe (L = 1 m, Ø 2 mm, with Lemo connection)
- Flexible coated mantle thermocouple, mantle Ø 2 mm
- Thermopile: blank
- Range: -40 °C.....+1200 °C (-40 °F ... +2192 °F)
- Accuracy: exceeds DIN IEC 584, class 1
- Response time ( $t_{99}$ ): 2.5 sec (water)



#### TPN 1221 \*\*

- same as TPN 1220 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 1220	Flexible high-temperature probe without cable, L = 1 m, Ø 2 mm, up to +1200 °C (+2192 °F), Lemo	1341-0927
TPN 1221	Flexible high-temperature probe without cable, L = 1 m, Ø 2 mm, up to +1200 °C (+2192 °F), SMP	1343-0927

## Other probes

### Thermal wire probes

Measurement of air, oven and gas temperatures.

#### TPN 600 \*

- Probe (L = 1 m, outside 1.9 x 1.2 mm, Isolation: glass/silk meshwork, with Lemo connection)
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t<sub>99</sub>, Air 0.2 m/s): 25 sec



#### TPN 601 \*\* same as TPN 600 but

- with SMP connection
- Without approval according to guideline 94/9 ATEX



#### TPN 610 \*

- Probe (L = 1 m, outside 0.8 x 1.2 mm, Isolation: glass/silk meshwork, with Lemo connection)
- Range: -50 °C ... +400 °C (-58 °F ... +752 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t<sub>99</sub>, Air 0.2 m/s): 25 sec



#### TPN 611 \*\*

- same as TPN 610 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 600	Flexible thermal wire probe without cable, L = 1 m, outside 1.9 x 1.2 mm, Lemo	1341-0646
TPN 601	Flexible thermal wire probe without cable, L = 1 m, outside 1.9 x 1.2 mm, SMP	1343-0646
TPN 610	Flexible thermal wire probe without cable, L = 1 m, outside 0.8 x 1.2 mm, Lemo	1341-0800
TPN 611	Flexible thermal wire probe without cable, L = 1 m, outside 0.8 x 1.2 mm, SMP	1343-0800

## Penetration probes

Temperature measurement of viscoplastic masses such as asphalt, bitumen or grounds.

### TPN 220 \*

- Probe (L = 100 mm, Ø 5 mm, stainless steel needle with tip, 1m silicone cable, with Lemo connection)
- Range: -200 °C ... +500 °C (-328 °F ... +932 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$ ): 3.0 sec



### TPN 221 \*\*

- same as TPN 220 but with SMP connection



### TPN 230 \*

- Probe (L = 100 mm, Ø 2.1 mm, stainless steel needle with tip, 1m silicone cable, with Lemo connection)
- Range: -200 °C ... +500 °C (-328 °F ... +932 °F)
- Accuracy: exceeds DIN IEC 584, class 2
- Response time ( $t_{99}$ ): 2.5 sec



### TPN 231 \*\*

- same as TPN 220 but with SMP connection



\* for TFN 520 and TFN 530

\*\* for TFN 520-SMP, TFN 530-SMP, TTX 120, TFI 550, TFI 650, EBI 40-TC-01 and EBI 40-TC-02

Type	Description	Part No.
TPN 220	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 5 mm, -200 °C ... +500 °C (-328 °F ... +932 °F), Lemo	1341-0664
TPN 221	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 5 mm, -200 °C ... +500 °C (-328 °F ... +932 °F), SMP	1343-0664
TPN 230	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 2.1 mm, -200 °C ... +500 °C (-328 °F ... +932 °F), Lemo	1341-0674
TPN 231	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 2.1 mm, -200 °C ... +500 °C (-328 °F ... +932 °F), SMP	1343-0674

# Humidity

On the next pages you will find three different hygrometers: one hygrometer with fixed humidity probe, one with humidity probe and cable and one hygrometer which also measures the surface temperature via infrared.



## Hygrometers

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### Applications:

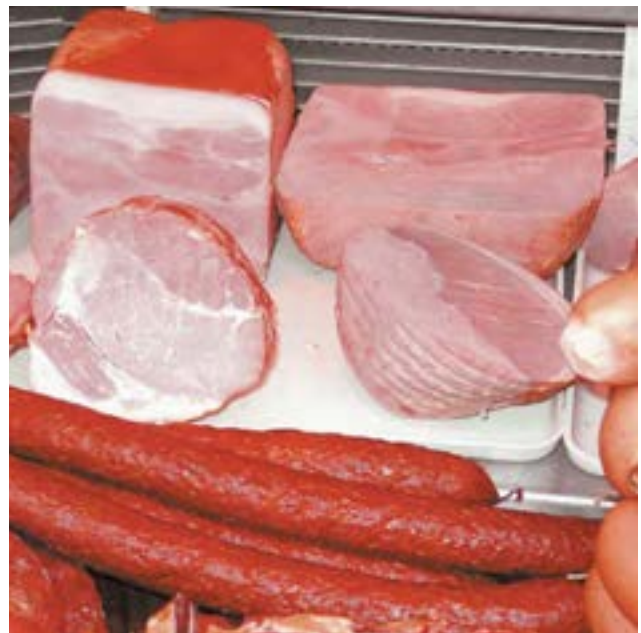
- Humidity and temperature measurement
  - Surface temperature measurement with special probes
  - Process monitoring
- 



# Hygrometers

Find your perfect hygrometer:

Hygrometers	Measurement range	Probe type	Probe connection
TFH 610 Hygrometer	0% rH ... 100% rH	Capacitive	Fixed
TFH 620 Hygrometer	0% rH ... 100% rH	Capacitive	Lemo
THI 350 Hygrometer/Infrared Thermometer	0% rH ... 100% rH	Infrared (temperature and humidity)	





## TFH 610 Hygrometer with fixed humidity probe



### Technical Data

Measurement range: Humidity	0 % rH ... 100 % rH
Measurement range: Temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Accuracy: Humidity	±2.5 % rH (from 10 % ... 90 %)
Accuracy: Temperature	±0.5 °C (±0.9 °F)
Resolution: Humidity	0.1 %
Resolution: Temperature	0.1 °C (0.2 °F)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Protection class	IP 40
Dimensions (L x W x H)	115 x 54 x 22 mm
Weight	Approximately 90 g
Humidity sensor	External capacitive sensor, fixed
Temperature sensor	External thermistor
Battery	Lithium battery 3.0 V / 1000 mAh
Battery lifetime	Up to 5 years
Sampling rate	1 sec to 15 sec
Certificate	Factory calibration certificate

- Approximately 5 years battery life time

Type	Description	Part No.
TFH 610	Hygrometer for humidity and temperature measurement	1340-5610

## TFH 620 Hygrometer with MIN/MAX and hold options



### Technical Data

Measurement range: Humidity	0 % rH ... 100 % rH
Measurement range: Temperature	0 °C ... +60 °C (32 °F ... 140 °F)
Accuracy: Humidity	±2 % rH (from 5 % ... 95 %)
Accuracy: Temperature	±0.3 °C (±0.5 °F)
Resolution: Humidity	0.1 %
Resolution: Temperature	0.1 °C (0.2 °F)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Protection class	IP 67 (device without probe)
Dimensions (L x W x H)	115 x 54 x 22 mm
Weight	Approximately 90 g
Humidity sensor	External capacitive sensor, removeable
Temperature sensor	External Pt 1000 sensor
Probe position	External, plug-in probe, cable length 90 cm
Battery	Lithium battery 3.0 V / 1000 mAh
Battery lifetime	Up to 5 years
Sampling rate	1 sec to 15 sec
Certificate	Factory calibration certificate

- High precision
- Approximately 5 years battery life time

Type	Description	Part No.
TFH 620 + TPH 100	Hygrometer for humidity and temperature measurements with air probe	1340-5621

## Accessories for TFH Hygrometers



**AG 140** Protective cover for handheld devices, red



**AH 100** PTFE filter for TFH 610 and TFH 620



**AH 200** Bronze sintered filter for TFH 610 and TFH 620



**AH 300** Stainless steel sintered filter for TFH 610 and TFH 620

Type	Description	Part No.
AG 140	Protective cover for handheld devices, red	1340-5005
AH 100	PTFE filter for TFH 610 and TFH 620	1340-5627
AH 200	Bronze sintered filter for TFH 610 and TFH 620	1340-5626
AH 300	Stainless steel sintered filter for TFH 610 and TFH 620	1340-5625

## THI 350 Hygrometer/Infrared Thermometer with automatic dew point calculation



- Visible and audible alarm upon exceeding of user settable limits
- Distance:spot ratio = 12:1

### Technical Data

Measurement range	-60 °C ... +500 °C (-76 °F ... +932 °F)
Temperature accuracy	±1.0 °C (+15 °C ... +35 °C), ±2 °C (-33 °C ... 500 °C), ±2 °C for the remaining measurement range
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Resolution (-9,9~199,9 °C)	0.1 °C / 0.1 °F
Response time	1 sec
Operating Temperature	0 °C to +50 °C (+32 °F to +122 °C)
Distance:Spot	12:1
Measurement range relative air humidity (T <sub>amb</sub> = 23 ± 5degC)	1~99 %
Accuracy	± 3 % of 20~80 %, otherwise ±5 %
Dew point	-50~50 °C, Accuracy: ±2.5 °C of 20~30 %rH; ±2 °C of 31~40 % rH; ±1,5 °C of 41~95 rH
Battery	2 x AAA Micro (Alkaline recommended)
Battery lifetime	Typically 180 h, at least 140 h of continuous use
Dimensions (L x W x H)	46 x 143 x 184.8 mm
Certificate	Factory calibration certificate

Type	Description	Part No.
THI 350	Infrared thermometer with air humidity measurement	1340-1790

## Filter for the ebro humidity devices

ebro provides convenient filters for their humidity devices in order to protect the sensitive humidity probes from mechanical strain and dust. Effectively, this enhances the protection class of the device.



Both data loggers and handheld devices can be equipped with the filters:

- EBI 10-TH100 (see p. 19)
- EBI 25-TH (see p. 65)
- EBI 300 TH (see p. 75)
- EBI 310 TH (see p. 78)
- TFH 610 (see p. 140)
- TFH 620 (see p. 140)





## Installation of the filters

Installation is very easy: unscrew the plastic protection cap - screw the filter - done!

### Types of filters

**ebro provides three different filters:**



The **bronze sintered filter** provides a strong protection from mechanical strain. It has no aperture windows like the plastic protection cap shipped by default, but covers the probe completely. The sintered material lets the humidity through, though. The protection class increases to IP 40.



The **stainless steel sintered filter** also increases the protection class to IP 40. The stainless steel massively increases the mechanical protection, e.g. from crushing the filter. Nothing will happen to your probe! In addition, the stainless steel is highly resistant to corrosion even in high temperature applications.



The **PTFE-filter** provides little protection from mechanical strain but seals the probe from dust - protection class IP 60. In dusty environments, unprotected humidity probes, or probes protected by sintered filters, can quickly be covered by dust. This massively affects the humidity measurement, or prohibits it entirely. It won't happen with the PTFE filter.

Type	Description	Part No.
AH 100	PTFE filter	1340-5627
AH 200	Bronze sintered filter	1340-5626
AH 300	Stainless steel sintered filter	1340-5625

# pH & Conductivity

The following pages contain a variety of instruments for the measurement of pH values as well as conductivity in microSiemens.

PHX 800 as a standard testing device for the pH values. TDS 3 as a standard testing device for microSiemens/cm<sup>2</sup>.

For professional use one can select from the following range: PHT 810 pH meter instrument and PHT 830 pH meter, temperature compensated, with a variety of different electrodes, and the CT 830 conductivity measurement instrument, temperature compensated.




PHT 810  
pH Meter

PHT 830  
pH Meter

CT 830  
Conductivity Meter

pH and  
Conductivity  
Standard Tester

The extended product range of  provides you with additional solutions for your major challenges in pH and conductivity measurement. For more information go to [www.WTW.com](http://www.WTW.com).



## pH and Conductivity Meter and Tester

Find your perfect meter:

Meter	Parameter	Measurement range	Probe type	Probe connection
PHT 810 pH Meter	pH	0 pH ... 14 pH	Various electrodes available	BNC
PHT 830 pH Meter	pH	0 pH ... 14 pH	pH-electrode with plastic shaft	Plug BK 6-pin
PHX 800 pH Tester	pH	0 pH ... 14 pH	Integrated electrode	-
CT 830 Conductivity Meter	Conductivity	0 ... 200 $\mu$ S, 0 ... 2000 $\mu$ S, 0 ... 20 mS, 0 ... 500 mS	Graphite electrode	Plug BK 6-pin
TDS 3 Conductivity Tester	Conductivity	0 ... 1,999 $\mu$ S, 0 ... 19.99 mS	Integrated electrode	-



## PHT 830 pH Meter with temperature compensation



- Configuration directly on device using 5 buttons and display
- Graphic LCD display with backlight
- Logging function
- Temperature compensated



### Technical Data

Measurement range	pH:	0 pH ... 14 pH
	mV:	-1999 ... 1999 mV
	Temperature:	-10 °C ... +100 °C
Resolution	pH:	0.01 pH;
	mV:	1 mV
	Temperature:	0.1 °C
Accuracy	pH:	± 0.03 (± 2 pH-units)
	Temperature:	± 0.1 °C
Memory	4000 values	
Temperature	-10 °C ... +100 °C	
Display	128 x 64 Pixel, backlight	
Interface	USB "Interface HMG USB"	
Battery	3 Batteries Type AA, IEC R6, LR6, 1.5 V	
Ambient	-10 °C ... +55 °C (+14 °F ... 131 °F)	
Relative humidity	< 95% (non-condensing)	
Connectors	Plug BK 6 pin (4 pin interface)	
Housing	ABS plastic	
Protection class	IP 65	
Dimension (L x W x D)	200 x 95 x 40 mm	
Weight	290 g	

### The set contains:

- PHT 830 pH Meter
- pH electrode, depending on Set type
- Buffer solution pH 4, pH 7, pH 9
- KCl solution
- Carrying case

Type	Description	Part No.
PHT 830 SET 1	pH Meter with plastic electrode	1340-5812
PHT 830 SET 2	pH Meter with glass electrode	1340-5813
PHT 830 SET 3	pH Meter with penetration electrode	1340-5814

## CT 830 Conductivity Meter with auto range



- Configuration directly on device using 5 buttons and display
- Graphic LCD display with backlight
- Logging function
- Temperature compensated



### Technical Data

Measurement range	0 ... 200 $\mu$ S 0 ... 2000 $\mu$ S	TDS 0 ... 200 mg/l TDS 0 ... 2000 mg/l
Resolution	0.1 $\mu$ S; 1 $\mu$ S	
Accuracy	Conductivity: $\pm$ 0.5 % full scale Temperature: $\pm$ 0.1 $^{\circ}$ C	
Temperature	-10 $^{\circ}$ C ... +100 $^{\circ}$ C	
Display	128 x 64 Pixel, backlight	
Interface	USB "Interface HMG USB"	
Battery	3 Batteries Type AA, IEC R6, LR6, 1.5 V	
Ambient	-10 $^{\circ}$ C ... +55 $^{\circ}$ C (+14 $^{\circ}$ F ... 131 $^{\circ}$ F)	
Relative humidity	< 95% (non-condensing)	
Connectors	Plug BK 6 pin (4 pin interface)	
Housing	ABS plastic	
Protection class	IP 65	
Dimension (L x W x D)	200 x 95 x 40 mm	
Weight	290 g	

### The set contains:

- CT Conductivity Meter
- Conductivity electrode
- Calibration solution  
147  $\mu$ S/cm
- Carrying case

Type	Description	Part No.
CT830 SET	Conductivity Meter	1340-5835

## Various electrodes for PHT 830



### AT 830 pH K Binder

Temperature compensated  
Housing material: plastic  
Cable length: 150 cm  
Diameter: 12 mm  
Shaft length: 120 mm



### AT 830 pH G Binder, laboratory electrode

Temperature compensated  
Shaft housing material: glass  
Cable length: 100 cm  
Shaft diameter: 12 mm  
Shaft length: 900 mm



### AT 830 pH E Binder, penetration electrode

Temperature compensated for measurements in semi-solid food products and other materials.

Housing material: glass  
Cable length: 100 cm  
Shaft/electrode diameter: 25 mm/5 mm  
Shaft/electrode length: 65 mm/12 mm

Technical Data	AT 830 pH K	AT 830 pH G	AT 830 pH E
pH measurement range	0 pH ... 14 pH	0 pH ... 14 pH	2 pH ... 13 pH
Temperature measurement range	0 °C ... +100 °C (+32 °F ... +212 °F)	0 °C ... +100 °C (+32 °F ... +212 °F)	+5 °C ... +80 °C (+41 °F ... +176 °F)
Electrolyte	Gel	Gel	Referid®

Type	Description	Part No.
AT 830 pH K Binder	Plastic electrode	1339-0661
AT 830 pH G Binder	Measurement electrode for laboratories	1339-0662
AT 830 pH E Binder	Penetration electrode	1339-0663

## Electrode for CT 830



### AT 830 C K Binder

Temperature compensated  
Housing material: plastic  
Cable length: 150 cm  
Diameter: 12 mm  
Shaft length: 120 mm



Technical Data	AT 830 C K
Conductivity measurement range	0 μS ... 500 mS
Temperature measurement range	0 °C ... +100 °C (+32 °F ... +212 °F)

Type	Description	Part No.
AT 830 C K Binder	Plastic electrode	1339-0660

## Interface cable for PHT 830 and CT 830



### EBI IF 830

For read out the memory of the PHT 830 and CT830



Type	Description	Part No.
EBI IF 830	Interface for PHT 830 and CT 830	1340-6011

## PHX 800 Basic pH Tester with acoustic signal



- Automatic deactivation
- Battery charge indicator
- Replaceable battery

### Technical Data

pH measurement range	0 pH ... 14 pH
pH measurement accuracy	0.1 pH
pH resolution	±0.2 pH
Operating temperature	0 °C ... +50 °C (+32 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Housing material	ABS plastic
Dimension (L x W x H)	170 x 32 x 15 mm
Weight	Approximately 70 g
Battery	1.5 V A76/LR44
Battery lifetime	Approximately 150 hours
Deactivation	Automatically after 15 minutes

Type	Description	Part No.
PHX 800	Basic pH Tester	1340-5800

## TDS 3 Basic Conductivity Tester Dual Display



- Battery charge indicator
- Replaceable battery

### Technical Data

Measurement range	0 ... 1,999 µS	0 ... 1,999 ppm
	0 ... 19.99 mS	0 ... 19.99 ppt
Measurement accuracy	1 µS	
Resolution	1 µS	
Operating temperature	0 °C ... +50 °C (+32 °F ... 122 °F)	
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)	
Housing material	ABS plastic	
Dimension (L x W x H)	170 x 32 x 15 mm	
Weight	Approximately 70 g	
Battery	4 x 1.5 V A76/LR44	
Battery lifetime	Approximately 150 hours	

Type	Description	Part No.
TDS 3	Basic Conductivity Tester	1340-5831

## PHT 810 pH Meter with automatic pH calibration



PHT 810



PHT 810 + AT 206



ST 1000



The device has been certified together with the EB 4401 food inspection case (please see page 161).

### Technical Data

pH measurement range	0 pH ... 14 pH
pH measurement accuracy	0.03 pH
pH resolution	0.01 pH
Memory	Hold, MIN / MAX
Connector	BNC
Battery lifetime	Up to 5 years
Display	LCD, 12 mm
Operating temperature	0 °C ... +50 °C (+32 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Dimensions (L x W x H)	110 x 54 x 22 mm
Temperature compensation	Manual
Weight	Approximately 200 g
Certificate	2-point factory calibration certificate (included at pH meter set)

\* Various electrodes available  
(see p. 151)

- MIN/MAX and hold options
- Approximately 5 years battery life time

Type	Description	Part No.
PHT 810	pH Meter (without electrode*)	1340-5810
ST 1000	pH Meter Set (consisting of PHT 810, penetration electrode AT 206, punching pin, buffer solutions pH4 and pH7, carrying case)	1339-0620



## Various electrodes for PHT 810

### AT 200 plastic electrode

Housing material: plastic  
 Diameter: 12 mm  
 Shaft length: 120 mm



### AT 201 laboratory electrode

Shaft housing material: glass  
 Shaft diameter: 12 mm  
 Shaft length: 900 mm



### AT 206 penetration electrode

for measurements in semi-solid food products and other materials.

Housing material: glass  
 Shaft/electrode diameter: 25 mm/5 mm  
 Shaft/electrode length: 65 mm/12 mm  
 with 1m cable and BNC plug



Technical Data	AT 200	AT 201	AT 206
pH measurement range	0 pH ... 14 pH	0 pH ... 14 pH	2 pH ... 13 pH
Temperature measurement range	-5 °C ... +80 °C (+23 °F ... +176 °F)	-15 °C ... +130 °C (+5 °F ... +266 °F)	+5 °C ... +80 °C (+41 °F ... +176 °F)
Electrolyte	Gel	Gel	Referid®

Type	Description	Part No.
AT 200	Plastic electrode	1339-0631
AT 201	Measurement electrode for laboratories	1339-0632
AT 206	Penetration electrode	1339-0629

## Accessories for PHT 810



**AG 140** Protective cover for handheld devices, red



**AT 100-PHT** Carrying case



**AT 400** Buffer solution pH 4



**AT 401** Buffer solution pH 7



**AT 405** KCl solution

Type	Description	Part No.
AG 140	Protective cover for handheld devices, red	1340-5005
AT 100-PHT	Carrying case	1340-5091
AT 400	Buffer solution pH 4	1341-3836
AT 401	Buffer solution pH 7	1341-3838
AT 405	KCl solution	1341-3839

# Pressure

On the next pages you will find more information about the robust and highly accurate VAM 320 Vacuometer which is also available with EX certification.

## Vacuometer

---

### Applications:

- Measurement of low atmosphere pressure
  - Measurement in potentially explosive atmospheres:  $\text{Ex II 2G Ex ib IIC T4 Gb}$  for ambient temperatures up to +50 °C (+122 °F)
  - Process monitoring
- 

## Vacuometer



## VAM 320/VAM 320-EX Vacuometer

### Robust high accuracy vacuometer



- Sets with tube, glass and bead connectors available
- Acid and base resistant plug-in sensor

#### Technical Data

Measurement range	0 mbar ... 2000 mbar
Maximum pressure	3200 mbar
Resolution	1 mbar, 0.1 kPa, 0.01psi, 1torr
Accuracy	±0.4 % ±1 digit of measurement range
Sampling rate	0.25 sec to 15 sec, adjustable
Sensor connection	Lemo plug, size 0, 4-pole
Electric power supply	Integrated rechargeable Li-Polymer battery
Operating temperature	0 °C ... +50 °C (at max. 85 % rF)
Storage temperature	-5 °C ... +50 °C
Dimensions (L x W x H)	170 x 45 x 24 mm (Polyamid 6.6)
Sensor dimensions	30 mm x Ø 40 mm (PEEK)
Protection class	IP 50 (device without probe)
Weight	Approximately 150 g
Certificate	2-point factory calibration
EX certification number	BVS 03 ATEX E 068

Type	Description	Part No.
VAM 320	Vacuometer	1340-5350
VAM 320-Set	Vacuometer with charging station, tube, glass and bead connectors	1340-5351
VAM 320-EX	Vacuometer with EX certification	1340-5352
VAM 320-EX set	Vacuometer with EX certification, charging station, tube, glass and bead connectors	1340-5353

### Accessories for VAM 320 and VAM 320-EX



AG 200 Charging station



VMF Bead connector



VMGL Glass connector



VMS Tube connector

Type	Description	Part No.
AG 200	Charging station	1340-5050
VMF	Bead connector	1300-0250
VMGL	Glass connector	1300-0260
VMS	Tube connector	1300-0255

# Concentration

On the next pages you will find various Digital Hand Refractometers which are available as single and dual scale models for a broad application range. In addition, we have a Salt Meter for measuring the salt content for example in fluid and semi solid food in our range.



## Refractometer

### Description:

Digital handheld refractometers for measuring the concentration of different substances in liquid and semi-solid products. The devices feature an automatic temperature compensation and are easy to use.

### Applications:

Concentration measurement of:

- Sugar
- Salt
- Alcohol
- Urea



## Salt Meter

### Description:

The SSX 210 Salt Meter is used to measure the salt content in fluid and semi-solid food products, such as meat, cold cuts, cheese, salads etc. The measurement is performed by determination of the electrical conductivity, as it is dependent on the salt content.

### Applications:

Concentration measurement of:

- Salt



## Refractometer and Salt Meter Set



## DR Digital Hand Refractometers with internal light source



- Wide application scope
- Single and duo scale models
- Zero-calibration with water

### Technical Data

#### Measurement Performance

Automatic Temperature Compensation (ATC)	ICUMSA (depending on model)
Working temperature range	+5 °C ... +40 °C (+41 °F ... +104 °F)
Sample temperature range	+5 °C ... +60 °C (+41 °F ... +140 °F)
Temperature sensor accuracy	±1 °C (+5 °C ... +40 °C)
Measurement time	2 sec.
Sample indicator	High, Low or No sample
Protection class	IP 65 (water resistant)
Battery	3V 2 x AAA (LR03)
Battery lifetime	10000 readings (minimum)

#### Construction

Prism material	Optical glass
Prism seal	Silicon rubber and Viton
Sample dish	316 stainless steel
Sample surface diameter	8 mm
Sample volume	0.3 ml
Case material	ABS

Type	Channel	Scale	Range	Resolution	Accuracy	ATC	Part No.
DR-10	A	Sugar % (°Brix)	0-54	0.1	±0.2	Bx	1340-5650
DR-11	A	Sugar % (°Brix)	0-54	0.1	±0.2	NONE	1340-5651
DR-60	A	Refractive Index (RI)	1.33-1.42	0.0001	±0.0003	Bx	1340-5652
DR-50	A	Starch %	0-30	0.1	±0.2	Bx	1340-5653
DR-20	A	Seawater SG	1.000-1.090	0.0005	±0.001	NaCl	1340-5654
DR-21	A	Seawater PPT	0-180	1	±1	NaCl	1340-5655
DR-61	A	Wort SG (Sucrose Equivalent)	1.000-1.120	0.0005	±0.001	Bx	1340-5656
DR-22	A	Salinity (% NaCl)	0-28	0.1	±0.2	NaCl	1340-5657
DR-30	A	% Urea (CRC data)	0-40	0.1	±0.2	AUS32	1340-5658
DR-31	A	% Urea (AUS-32)	0-40	0.1	±0.2	AUS32	1340-5660
DR-740	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5661
	B	Alcohol Probable (AP)	0-22	0.1	±0.2	Bx	
DR-712	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5664
	B	KMW (Babo)	0-25	1	±1	Bx	
DR-741	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5667
	B	ABV (°Zeiss)	10-135	0.1	±0.5	Bx	
DR-620	A	°Brix	0-54	0.1	±0.2	Bx	1340-5668
	B	Salinity (% NaCl)	0-28	0.1	±0.2	NaCl	

additional refractometer types available upon request

## SSX 210 Salt Meter Set with gold-plated electrodes probe



### Technical Data

Measurement range	0 ... 100
Resolution	1 Digit
Accuracy (at +25 °C / 77 °F)	±1 Digit
Operating temperature	+10 °C ... +40 °C (50 °F ... 104 °F)
Measurement rate	1 s to 15 s, adjustable
Deactivation	Automatically after 5 min., deactivatable
Protection class	IP 54
Dimensions (L x W x H)	100 x 46 x 25 mm
Housing material	ABS
Probe	2-conductor-measurement probe with gold-plated electrodes
Probe cable	Silicone
Weight	Approximately 200 g
Battery	Lithium 3 V / 1 Ah, type CR2477
Battery lifetime	Up to 5 years, depending on use

- Automatic deactivation
- Approximately 5 years battery life time

Type	Description	Part No.
SSX 210-Set	Salt meter set (consisting of salt meter and case)	1340-5211

## Accessories for SSX 210



**AG 140** Protective cover for handheld devices, red



**AG 160** Stainless steel bracket



**AG 161** Stainless steel bracket for TFN devices with protective cover AG 140

Type	Description	Part No.
AG 140	Protective cover for handheld devices, red	1340-5005
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket for TFN devices in protective cover AG 140 (AG 140 not included)	1340-0596

# Food inspection

On the next pages you will find devices which are especially suitable for the food sector: the robust FOM 320 Food Oil Monitor for measuring the food oil quality and the EB 4401 Food Inspection Case which contains various devices for comprehensive food inspections.



FOM 320 Food Oil Monitor

**Description:**

- Fast and reliable measurement of the food oil quality directly in the hot food oil
- Determination of the right time to replace the food oil for consistently high frying quality and food oil savings of up to 10%

**Applications:**

Food oil measurement for:

- Process optimization
- Quality control



EB 4401 Food Inspection Case

**Description:**

Contains the required handhelds, data loggers and tools for comprehensive food inspections.

**Applications:**

- For inspecting food preparation, storage and transport as well as for hygiene





## Food Oil Monitor and Food Inspection Case



## FOM 320 Food Oil Monitor with simple oil type selection



Back

### Technical Data

Measurement range: oil	0 % ... 40 % TPM* (oil temperature of +50 °C to +200 °C / +122 °F to +392 °F)
Accuracy: oil	Typically ± 2 %
Resolution: oil	0.5 %
Measurement range: temperature	+50 °C ... +200 °C (+122 °F ... +392 °F)
Accuracy: temperature	± 1 °C
Resolution: temperature	0.1 °C
Operating temperature	-20 °C ... +50 °C (-4 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Battery	3V lithium, replaceable
Battery lifetime	Up to 3 years
Dimensions (L x B x H)	304 x 54 x 22 mm
Housing material	ABS (food safe)
Weight	Approximately 200 g
Protection class	Waterproof IP 67
Certificate	Factory calibration certificate

\*TPM: Total polar materials

- Rugged sensor protection
- Impact resistant, waterproof housing (IP 67)
- Simple one-button operation

Type	Description	Part No.
FOM 320 Set	Food Oil Monitor Set (incl.: food oil monitor, protective cover, carrying case)	1340-1570

## Accessories for FOM 320



AM 130 Carrying case



AM 140 Protective cover



AG 160 Stainless steel bracket



AG 161 Stainless steel bracket (for handheld devices with AM 140)

Type	Description	Part No.
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket (for handheld devices with AM 140)	1340-0596
AM 130	Carrying case	1340-1594
AM 140	Protective cover with strap, red (more colors available on request)	1340-5007

# EB 4401 Food Inspection Case for inspecting food preparation, storage and transport, for hygiene



### The new standard Food Inspection Case contains:

- Frying oil quality measurement device **FOM 320**
- Conformity valued thermometer **TFX 422C**
- pH-measurement device **PHT 810** incl. accessories (penetration electrode, buffer solution)
- Dual Infrared / Fold-Back Thermometer **TLC 730**
- **EBI 300** USB temperature data logger with Winlog.basic evaluation software
- Flashlight
- Knife, tweezers, scissors, magnifying glass

The **FOM 320 food oil monitor** measures frying oil quality directly in the fryer. Through regular tests, it is possible to achieve consistently good quality of fried products in accordance with the food hygiene regulations (HACCP). The user has the greatest possible assurance that he is changing the oil at the right time. Measurement range: 50 °C ... +220 °C (122 °F ... 428 °F) Polar compounds (TPM): 0 % ... 40 %

see p. 160

The **TFX 422C thermometer** is conformity certified and particularly suitable for measuring core temperature and the temperature of deep-frozen goods. Measurement range -50°C ... +200°C (-58°F ... +392°F)

see p. 100

The **PHT 810 pH meter** measures pH-values in meat, cold cuts, cheese and liquids. The device features user-friendly calibration using the keypad. The measurement range is 0 pH ... 14 pH

see p. 150

The **TLC 730 Dual Infrared thermometer with laserpointer** for food is suitable for fast checks on refrigerated goods during storage, goods receipt checks and process monitoring. It avoids product contamination by using a non-contact measurement process. Its practical pocket size makes it easy to transport. The measurement range is -50 °C ... +350 °C (-58 °F ... 662 °F)

see p. 120

The **EBI 300 USB temperature data logger** monitors temperature during transport and storage. After the measurement, just plug in the data logger in the USB port of a PC and the logger automatically generates a PDF report with all important measurement data. Measurement range: -30 °C ... +70 °C (-22 °F ... +158 °F)

see p. 74

**BUNDESVERBAND DER LEBENSMITTELKONTROLLEURE e.V.**

Bundesverband der Lebensmittelkontrolleure · Hagenstr. 15 · 57489 Drolshagen  
 WTW GmbH  
 Geschäftsbereich ebros Electronic  
 Pefingerstraße 10  
 85055 Ingolstadt

**BVLK**  
 Hagenstr. 15  
 57489 Drolshagen  
 Telefon: 02781-928840  
 Telefax: 02781-928883  
 Internet: www.lebensmittelkontrolleure.de  
 E-Mail: lebensmittelkontrolleure@bvlk.de

December 15, 2014

Recommendation

Dear Sir or Madam,

by agreement the German association of Food quality controllers has tested the Food Inspection Case EB 4401.

The new Food Inspection Case EB 4401 was upgraded with the following precision measurement instruments:

Data Logger: **EBI 300**  
 Food Oil Monitor: **FOM 320**  
 pH Tester: **PHT 810**  
 Laboratory Thermometer: **TFX 422**  
 Dual Infrared / Fold Back Thermometer: **TLC 730**

These precise and reliable measurement instruments are predestined to increase food safety with proper application.

Of course the new Food Inspection Case EB 4401 includes scissors, tweezers, deep freeze driller, knife and flashlight.

Therefore the EB 4401 is the perfect instrument not only for food inspections, but is also essential for the food industry.

For these reasons, we hereby authorize you to use our association seal for the food inspection case EB 4401, together with the remark: "Recommended by the Federation of Food Inspectors of Germany" (BVLK) for the period from 01.01.2015 to 31.12.2015 in your sales and advertising materials. Any changes must be reported in a timely manner to the BVLK, should not be this, the recommendation will go out or will be withdrawn.

Anja Tittes  
 (Chairwoman)

Type	Description	Part No.
EB 4401	Food inspection case	1341-4405

# Room climate

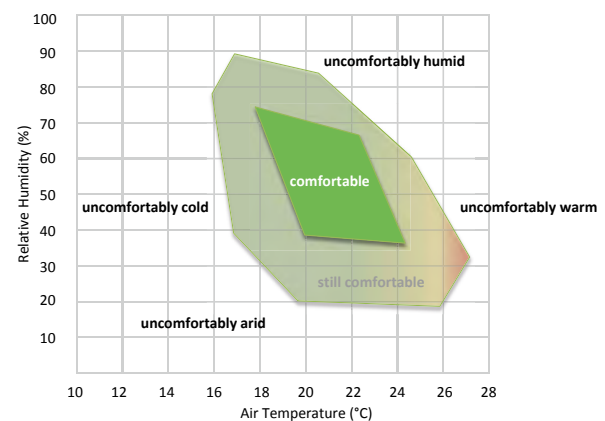
The room climate describes the sum of the influences on the comfort of persons while being indoors. It is an essential component of the quality of living conditions and comfort, and is determined mostly by the air temperature and humidity, as well as the CO<sub>2</sub> value.

Most of the time, the air humidity is detected by persons only when reaching extreme values. Often, it is already too late by then and the condensation of high air humidity leads to mold formation at cool surfaces.

The climate in office rooms has a critical impact on the productive efficiency and health of employees. An improvement of the room climate can increase the productivity by up to 15 %, while at the same time decrease the risk of respiratory diseases dramatically.

Measures to improve the room climate can to some extent be taken quickly and straightforward, e.g. by frequent venting and vegetating the office room. The challenge is to measure the "thick air" objectively, and most of all: to be aware of it. The lingering decrease of air quality is often not perceived, although its negative impact is there.

The **new room climate monitor RM 100** is putting things right. It measures air temperature and humidity as well as the CO<sub>2</sub> value at the same time. The measurement values are easily readable due to the large, illuminated display. In addition, the CO<sub>2</sub> level in the air is indicated via three LEDs as good, average or bad. When the limit is exceeded, the RM 100 will raise an acoustic alarm - then it's high time to vent.



## Room climate monitor RM 100

### Applications:

- Objective evaluation of the room climate
- Preservation and increase of employees' power of concentration and productive efficiency
- Increase of comfort and satisfaction
- Decrease of health risks

# Room climate monitor



RM 100 **Room climate monitor**  
*Objective evaluation of the room climate*



- Large, illuminated display
- Measurement of air temperature, humidity and CO<sub>2</sub> value
- Alarming when limit is exceeded

### Technical Data

Measurement range CO <sub>2</sub>	0 ... 3000ppm
Measurement range temp.	0°C ... +50°C
Measurement range humidity	20% ... 90%rH
Operation temperature	0°C ... +50°C
Storage temperature	-20°C ... +60°C
Power supply	USB or 5V-Adapter (included)
Dimensions	137 x 99 x 29mm
Weight	200g

*Approximately available from Q2 2016*

Type	Description	Part No.
RM 100	Room climate monitor	1348-0001

# Calibration

## Factory Calibration

Most ebro measuring equipment is supplied with a factory calibration certificate. The functionality and the tolerances indicated in the technical specifications are thus ensured. Factory calibration is completed with DAkkS-calibrated factory normal.

- Calibration completed using special equipment.
- All factory certificates issued by trained personnel.
- The factory calibration certificate confirms the suitability of the device for official calibration.
- This calibration is completed for all new devices and standard replacement devices.

## Confirmation of Conformity

Values measured by a conformity confirmed that has been officially calibrated are legally binding. Therefore such a device is ideal for use by government inspection authorities such as food inspectors or certified court experts.

- Currently, confirmation of conformity is completed by government gauging offices only.
- Instrument whose compliance is to be confirmed must have a special type approval from the Physikalisch Technische Bundesanstalt (PTB) in order to be eligible for official calibration.
- The confirmation of conformity certificate indicates the display correction and duration of validity.
- ebro offers the TFX 422C as a conformity verified thermometer.



Precision measurement and testing equipment such as thermometers and data loggers should be checked and calibrated regularly.

## Calibration according to ISO 9000

Modern quality assurance systems like ISO 9000, QS 9000, GxP and FDA require testing and measuring equipment checks, which also include a regular calibration of these devices. ebro ISO calibration is an economical, fast and precise option for the fulfillment of these requirements.

- Calibration is done by calibration experts in a special laboratory.
- The results are documented in detail, including traceability information of the reference devices, in a so-called ISO certificate.
- Manufacturer-independent calibration, devices from other manufacturers can be calibrated.
- Calibration also includes device adjustment, if necessary (only for ebro devices).

We recommend that calibration be completed once per year for thermometers and pressure meters and once every 6 months for humidity meters. We will be happy to include you in our free ebro calibration reminder service.

The price for the calibration according to ISO 9000 includes certificate and **3 specified standard calibration points**. Freely selectable calibration points between -85 °C and +250 °C (-121 °F ... +482 °F) are available for a small fee.

The calibration of temperature / humidity loggers includes 2 to 3 humidity calibration points in the price. In addition a temperature calibration in the range of -40 °C ... +75 °C (-40 °F ... 167 °F) can be completed.

Incoming and outgoing calibrations can be done on demand.

## ISO Calibrations



Type	Description	Part No.
EBI 10 - family with 1 temperature	ISO Calibration <sup>1)</sup>	1020-3510
EBI 10 - family with 2 temperature channels	ISO Calibration <sup>1)</sup>	1020-3511
EBI 10 - family with 4 temperature channels	ISO Calibration <sup>1)</sup>	1020-3513
EBI 16	ISO Calibration <sup>1)</sup>	1020-3515
EBI 10 - family with 1 pressure and 1 temp. channel	ISO Calibration <sup>1)</sup>	1020-3520
EBI 10 -- family with 1 pressure and 2 temp. channels	ISO Calibration <sup>1)</sup>	1020-3521
EBI 10 - family with 1 pressure and 3 temp. channels	ISO Calibration <sup>1)</sup>	1020-3522
EBI 10 - family with 1 humidity and 1 temperature channel	ISO Calibration <sup>1)</sup>	1020-3525
EBI 40 - 6 temperature channels	ISO Calibration <sup>1)</sup>	1020-3540
EBI 40 - 12 temperature channels	ISO Calibration <sup>1)</sup>	1020-3541
EBI 100/11 - family with 1 temperature channel	ISO Calibration <sup>1)</sup>	1020-3550
EBI 100 - family with 2 temperature channels	ISO Calibration <sup>1)</sup>	1020-3551
EBI 100/11 - 1 pressure and 1 temperature channel	ISO Calibration <sup>1)</sup>	1020-3560
EBI 20/EBI 25/EBI 300/EBI 300 TE	ISO Calibration <sup>1)</sup>	1020-3580
EBI 20/EBI 25/EBI 300/EBI 300 TE	ISO Calibration <sup>1)</sup>	1020-3581
EBI 20TH/EBI 25TH - 1 humidity and 1 temperature channel	ISO Calibration <sup>1)</sup>	1020-3582
EBI 310 - with 1 temperature channel	ISO Calibration <sup>1)</sup>	1020-3585
EBI 310 TE, EBI 310 DI - with 2 temperature channels	ISO Calibration <sup>1)</sup>	1020-3586
EBI 310 TX - with 3 temperture channels	ISO Calibration <sup>1)</sup>	1020-3587
EBI 310 TH	ISO Calibration <sup>1)</sup>	1020-3588
TFN, TTX, GFX, PHT, VAM, TLC 1598, TFX, TFE	ISO Calibration <sup>1)</sup>	1020-3590
Dual Thermometer TLC 730	ISO Calibration <sup>1)</sup>	1020-3591
For TFX 430 high precision hand helds	ISO Calibration <sup>1)</sup>	1020-3593
Additional calibration point	Additional calibration point ISO	1020-3599

- Certified according to EN ISO 9001 : 2008

ISO calibrations of other devices on request.

<sup>1)</sup> According to DIN ISO 9000 including certificate.

## DAkKS Calibration

DAkKS calibration is often needed for working standard measuring equipment, measuring equipment used by certified experts and for certain measurement procedures in medicine and pharmaceuticals – in other words, everywhere where an especially high degree of safety is required. This calibration is done by special DAkKS accredited laboratories that are monitored by the Physikalisch-Technische Bundesanstalt (PTB).

- Internationally recognized and comparable measurement results.
- DAkKS calibration is done by specially DAkKS authorized persons only.
- Traceable calibration in accordance with EN ISO 9001 and EN ISO/IEC 17025.
- Identification and documentation of the measurement uncertainty.
- Manufacturer-independent calibration, devices from other manufacturers can be calibrated.

We recommend that calibration be completed once per year for thermometers and once every 6 months for pressure and humidity meters. We will be happy to include you in our ebro calibration reminder service free of charge.

The price for the DAkKS calibration includes certificate includes **3 freely selectable calibration points** in the range of -85 °C ... +300 °C (-121 °F ... +572 °F) or 10% ... 95% for humidity calibration. Additional calibration points are available for a small fee.

## DAkKS Calibrations



Type	Description	Part No.
EBI 10 - family with 1 temperature channel	DAkKS Calibration <sup>2)</sup>	1020-3610
EBI 10 - family with 2 temperature channels	DAkKS Calibration <sup>2)</sup>	1020-3611
EBI 10 - family with 4 temperature channels	DAkKS Calibration <sup>2)</sup>	1020-3613
EBI 16	DAkKS Calibration <sup>2)</sup>	1020-3615
EBI 10 - family with 1 pressure and 1 temp. channel	DAkKS Calibration <sup>2)</sup>	1020-3620
EBI 10 - family with 1 pressure and 2 temp. channels	DAkKS Calibration <sup>2)</sup>	1020-3621
EBI 10 - family with 1 pressure and 3 temp-channels	DAkKS Calibration <sup>2)</sup>	1020-3622
EBI 10 - family with 1 humidity and 1 temperature channel	DAkKS Calibration <sup>2)</sup>	1020-3625
EBI 40 with 6 temperature channel	DAkKS Calibration <sup>2)</sup>	1020-3640
EBI 40 with 12 temperature channel	DAkKS Calibration <sup>2)</sup>	1020-3641
EBI 100/11 - family with 1 temperature channel	DAkKS Calibration <sup>2)</sup>	1020-3650
EBI 100 - family with 2 temperature channels	DAkKS Calibration <sup>2)</sup>	1020-3651
EBI 100/11 - family with 1 pressure and 1 temp. channel	DAkKS Calibration <sup>2)</sup>	1020-3660
EBI 20/EBI 25/EBI 300/TPC 400	DAkKS Calibration <sup>2)</sup>	1020-3680
EBI 20TH/EBI 25TH - 2 humidity and 2 temperature channels	DAkKS Calibration <sup>2)</sup>	1020-3682
EBI 310 - with 1 temperature channel	DAkKS Calibration <sup>2)</sup>	1020-3685
EBI 310 TE, EBI 310 DI - with 2 temperature channels	DAkKS Calibration <sup>2)</sup>	1020-3686
EBI 310 TX - with 3 temperature channels	DAkKS Calibration <sup>2)</sup>	1020-3687
EBI 310 TH	DAkKS Calibration <sup>2)</sup>	1020-3688
TFN, TFH, GFX, VAM, TLC 1598, TFX, TFE	DAkKS Calibration <sup>2)</sup>	1020-3690
TFX 430	DAkKS Calibration <sup>2)</sup>	1020-3693
Additional calibration point	Additional calibration point DAkKS	1020-3699

DAkKS calibrations of other devices on request.

<sup>2)</sup> According to DAkKS (Traceability to German Standard) including certificate.



## Calibration conditions for different calibrations

### Temperature Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions
ISO	Temperature measurement devices with air and submersible sensors, Temperature data logger	>-80 °C ... +250 °C (-112 °F ... 482 °F) >+250 °C ... +1000 °C (+482 °F ... 1832 °F)	Temperature-regulated Liquid baths, Calibration source
DAkks / DKD	Temperature measurement devices resistance thermometers, electronic thermometers and data loggers	0 °C (+32 °F) 0.01 °C (32.018 °F) -85 °C ... -35 °C (-121 °F ... -31 °F) -35 °C ... +250 °C (-31 °F ... 482 °F) +250 °C ... +300 °C (482 °F ... 572 °F) >+300 °C ... +1100 °C (>572 °F ... 2012 °F)	Ice point Water triple point Liquid bath Liquid bath Liquid bath Tube furnace
	Thermocouple	-85 °C ... 200 °C > 200 °C ... 300 °C	Liquid bath Liquid bath
Calibration	ebro Thermometer TFX 422 TFF 200	-40 °C ... +200 °C (-40 °F ... 392 °F)	Temperature-regulated Liquid baths

### Surface Temperature Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions
ISO	Temperature measurement devices with surface probe	+40 °C ... +250 °C (104 °F ... 482 °F)	Surface calibrator
ISO	Non-contact IR Temperature measurement devices	-35 °C ... +190 °C (-31 °F ... 374 °F)	Black emitter

### Humidity Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions
ISO	Measurement devices for relative humidity	10 % ... 30 % 30 % ... 60 % 60 % ... 95 % Temperature range: +5 °C ... +70 °C (41 °F ... 158 °F)	Two pressure humidity generator Temperature range: +5 °C to +70 °C (+41 °F to +158 °F)
DAkks / DKD	Measurement devices for relative humidity	10 % ... 30 % 30 % ... 60 % 60 % ... 95 % Temperature range: +5 °C ... +70 °C (41 °F ... 158 °F)	Two pressure humidity generator Temperature range: +5 °C to +70 °C (+41 °F to +158 °F)

### Pressure Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions
ISO	Absolute pressure	0 mbar ... 10,000 mbar	Pressure calibrator
DAkks / DKD	Absolute pressure	0mbar ... 35,000 mbar	In gases

### ISO Standard Calibration Points for ebro Products

Measurement device	Calibration points		
EBI 1 Logger 85, -85A and EBI 10	-20 °C (-4 °F)	0 °C (32 °F)	+60 °C (140 °F)
EBI 1 Logger 125, -125A, EBI 10 and EBI 11	0 °C (32 °F)	+60 °C (140 °F)	+134 °C (273 °F)
EBI 2 Logger / EBI 310	-20 °C (-4 °F)	0 °C (32 °F)	+60 °C (140 °F)
EBI 20 / EBI 300	-20 °C (-4 °F)	0 °C (32 °F)	
Thermometers with penetration probe	0 °C (32 °F)	+60 °C (140 °F)	+120 °C (248 °F)
Thermometers with surface probe	+50 °C (122 °F)	+100 °C (212 °F)	+200 °C (392 °F)
Thermometers without probe	-100 °C (-148 °F)	0 °C (32 °F)	+200 °C / +1000 °C (392 °F / 1.832 °F)
EBI 2 Humidity Logger	32.8 % -20 °C (-4 °F)	52.9 % 0 °C (32 °F)	75.4 % +60 °C (140 °F)

## AC 100 Mobile Calibration Bath

Temperature bath for the calibration of data loggers and handhelds



### Technical Data

Temperature operation range	+50 °C ... +200 °C (+122 °F ... +392 °F)
Accuracy	±0.05 °C
Setting accuracy	0.01 °C
Resolution	0.01 °C
Warm-up time	10 °C / Min
Cooling-off time	3 °C / Min
Stabilizing time	20 Min.
Filling capacity of bath	400 ml
Supply voltage	230 V / 50 Hz, other supply voltage on request
Weight	Approximately 10 kg
Carrying case	Black

Type	Description	Part No.
AC 100	Mobile calibration bath (with oil and probe positioner)	1340-6030
AC 110	Replacement calibration oil	1340-6031

## TFX 430-set Precision Thermometer Reference Device



### Technical Data

Measurement range	-100 °C ... +500 °C (-148 °F ... +932 °F)
Accuracy	±0.05 °C (-50 °C ... +199.99 °C) remaining measurement range: ±0.2 °C
Resolution	0.01 °C (-100,00 °C ... +199.99 °C) 0.1 °C remaining measurement range
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Measuring probe	Pt 100
Sampling rate	1 sec to 15 sec, adjustable
Battery	Lithium Battery 3 V / 1 Ah, Type CR 2477
Battery lifetime	Approximately 5 years
Deactivation	Automatically after 2 hours, deactivatable
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Protection class	IP 67
Weight	Approximately 90 g

Type	Description	Part No.
TFX 430-Set	Precision Thermometer Pt 100 set (Thermometer TFX 430, blunt probe TPX 130, extension cable AX 110, DAkkS-Calibration, aluminium case AG 130)	1340-5432

# More Informa- tion

More than  
100 distributors  
worldwide – find  
one near you at:  
**[www.ebro.com](http://www.ebro.com)**

## A guide to temperature limits

These temperature values insure optimum freshness:

Food	Transport and Storage Temperature	Retained samples for testing	
Fresh milk products	$\leq +6\text{ }^{\circ}\text{C}$	Save for a minimum of 10 days	$\leq -18\text{ }^{\circ}\text{C}$
Milk at a Dairy	$\leq +6\text{ }^{\circ}\text{C}$		
Pasteurized milk, repackaged milk	$\leq +8\text{ }^{\circ}\text{C}$		
Butter	$\leq +10\text{ }^{\circ}\text{C}$ ( $\leq +6\text{ }^{\circ}\text{C}$ for transport)	Hot Meals	
Dessert	$\leq +7\text{ }^{\circ}\text{C}$	Heated (core temperature)	$\geq +70\text{ }^{\circ}\text{C}$
Cheese (except hard cheese)	$\leq +10\text{ }^{\circ}\text{C}$	Food counter	$\geq +65\text{ }^{\circ}\text{C}$
Ice cream, prepackaged	$\leq -18\text{ }^{\circ}\text{C}$ ( $\leq -20\text{ }^{\circ}\text{C}$ for transport)	Cold Meals	
Ice cream, scooped and served	$\leq -10\text{ }^{\circ}\text{C}$	Storage temperature until serving	$\leq +7\text{ }^{\circ}\text{C}$
Eggs (if eggs to be stored over 18 days)	from $+5\text{ }^{\circ}\text{C}$ to $+8\text{ }^{\circ}\text{C}$	Disinfection facilities	
Egg products (deep frozen)	$\leq -18\text{ }^{\circ}\text{C}$	Water	$\geq +82\text{ }^{\circ}\text{C}$
Egg products (frozen)	$\leq -12\text{ }^{\circ}\text{C}$		
Egg products (fresh)	$\leq +4\text{ }^{\circ}\text{C}$		
Raw egg-containing food products (e.g. fresh mayonnaise)	$\leq +7\text{ }^{\circ}\text{C}$		
Bakery products with partially baked filling	$\leq +7\text{ }^{\circ}\text{C}$		
Fresh meat products, fresh meat (including big game)	$\leq +7\text{ }^{\circ}\text{C}$		
Fresh poultry (rabbit and small game)	$\leq +4\text{ }^{\circ}\text{C}$		
Exception: flightless birds (as approved)	$\leq +7\text{ }^{\circ}\text{C}$		
Meat preparation	$\leq +4\text{ }^{\circ}\text{C}$		
Meat preparation (production and sales on site)	$\leq +7\text{ }^{\circ}\text{C}$		
Cold cut plates	$\leq +7\text{ }^{\circ}\text{C}$		
Ground meat	$\leq +2\text{ }^{\circ}\text{C}$		
Ground meat (production and sales on site): 24 hours delivery	$\leq +7\text{ }^{\circ}\text{C}$ ( $\leq +2\text{ }^{\circ}\text{C}$ for transport)		
Offal / Organ meats	$\leq +3\text{ }^{\circ}\text{C}$		
Meat, poultry, fish (frozen)	$\leq -12\text{ }^{\circ}\text{C}$		
Meat, poultry, fish (deep frozen)	$\leq -18\text{ }^{\circ}\text{C}$		
Fish, fish products	in melting ice or $\leq +2\text{ }^{\circ}\text{C}$		
Smoked fish	$\leq +7\text{ }^{\circ}\text{C}$		
Fishery products (marinated, soured, smoked)	$\leq +7\text{ }^{\circ}\text{C}$ ( $\leq +6\text{ }^{\circ}\text{C}$ for transport)		
Fishery products (fresh) plus crawfish and mollusk products	in melting ice or $\leq +2\text{ }^{\circ}\text{C}$		
Delicatessen	$\leq +7\text{ }^{\circ}\text{C}$		
Raw fruit and vegetables	$\leq +7\text{ }^{\circ}\text{C}$		
Salads, fresh and / or crushed, delicatessen salads	$\leq +7\text{ }^{\circ}\text{C}$		

German Food Inspectors recommend ebro instruments

- Thermometers
- Temperature Data Loggers
- Food Oil Quality Meter



## Declarations of Conformity



Hereby we declare

WTW Wissenschaftlich-Technische Werkstätten GmbH  
Business Unit ebro Electronic  
Peringerstraße 10  
85055 Ingolstadt, Germany  
Phone: +49 841 95478-0  
Fax: +49 841 95478-80

that the following product

Product type:	<b>Data logger</b>
Type designation:	EBI 10-Txxx / -TPxxx, EBI 100-Txxx / -TPxxx, EBI 16, EBI 11-Txxx / -Pxxx / -TPxxx, EBI 25-T / -TE / -TX / -TH, EBI 20-T1 / -TE1 / -TF / -TH1, EBI 300, EBI 310, EBI 330, EBI 40-TC

is in compliance with the essential requirements and other relevant provisions of Directive 37/2005 EC.

The following harmonized standards have been used:

- **Tests, performance, suitability: EN 12830**
- **Periodic verification and calibration: EN 13486**

Eckehard Peschel, Business Unit Director

Hereby we declare

WTW Wissenschaftlich-Technische Werkstätten GmbH  
Business Unit ebro Electronic  
Peringerstraße 10  
85055 Ingolstadt, Germany  
Phone: +49 841 95478-0  
Fax: +49 841 95478-80

that the following product

Product type:	<b>Thermometer</b>
Type designation:	TLC 700, TLC 730, TLC 1598, TDC 150, TFX 410, TFX 410-1, TFX 420, TFX 422 C, TTX 100, TTX 110, TTX 120, TFE 510, TFN 520, TFN 530, TFN 520-EX, TFN 530-EX

is in compliance with the essential requirements and other relevant provisions of Directive 37/2005 EC.

The following harmonized standards have been used:

- **Tests, performance, suitability: EN 13485**
- **Periodic verification and calibration: EN 13486**

Eckehard Peschel, Business Unit Director

# Conditions of Delivery and Payment

July 2015. Changes reserved. Please find the latest version on our website: [www.ebro.com/en/agb.html](http://www.ebro.com/en/agb.html).

## 1. Validity

The following conditions apply to all sales. These conditions override all purchase order conditions of the customer unless a written agreement is obtained from WTW.

## 2. Limits of Supplier's Obligation

Our legal obligation is based solely on our written acknowledgment of order and on no other document. We reserve the right to make technical changes during the period of delivery; this will however not reduce the performance of the equipment supplied.

The technical documentation included with our offer – such as illustrations, drawings, indication of weight – will only be binding where expressly stated. Cost estimates, technical literature, drawings and other details are our property and may not be made available to a third party.

## 3. Price

The agreed price is subject to contract. Prices are ex works Weilheim i. OB., normal packing included. Transit packaging, freight, handling, delivery charges and all local taxes are charged to the purchaser's account.

The agreed prices are linked to type and quantity of product and may therefore change if the purchaser wishes to amend his order. The equipment will be insured for transit only at the specific request of the purchaser, with corresponding costs being charged to the purchaser's account. We exclude liability for selection of the most favourable method or cost of transportation.

In the event of cost increases for material and manufacturing during the time between order and delivery, we reserve the right to increase the sales price proportionately.

## 4. Minimum Order Value

The net order value should not be less than € 50.00, otherwise we do have to charge handling costs of € 15.00.

## 5. Terms of Payment

Payment shall be made free paying office of supplier in Weilheim i. OB., Germany, according to the payment conditions stated in the offer and/or order acknowledgment.

In the event of a delay in payment on the part of the purchaser, we reserve the right to charge interest on arrears to the amount of 2% above the current discount rate of the Deutsche Bundesbank (German Central Bank).

The purchaser may only claim a right of retention within the framework of the same contract. Counterclaims may only be offset by the purchaser if these claims have been accepted and finally decided.

## 6. Period of Delivery

All delivery times in our offers are approximate and not legally binding. The period of delivery is stated on the order acknowledgment and starts with the date of order acknowledgment, unless agreed otherwise, but not before the order has been finally clarified in writing. Delivery is subject to receipt of all relevant documents, full compliance with the terms of payment and other relevant duties.

The period of delivery may be extended due to unforeseen events such as war, riots, strike or late delivery by our own suppliers. Claims for indemnity against late or delayed delivery are excluded in all circumstances.

If our delivery is delayed because of slight negligence on our part, the purchaser is only entitled either to withdraw from the contract after stipulating a reasonable period within which delivery must take place, or to demand damages consisting of 0.5 % of the contract amount per week, but altogether no more than 5 % of the contract amount.

The rights of the purchaser to withdraw from the contract or claim damages up to a maximum of 5 % of the contract amount are likewise restricted, if we are totally or partially unable to effect delivery and if we are only responsible for slight negligence on our part.

If shipment or delivery are delayed at the request of the purchaser, storage costs of 0.5 % of the invoiced amount per month will be charged to the purchaser's account, commencing one month from the date of notification that the goods are ready for shipment. Such charges shall be limited to a total of 5 % unless proof of higher costs is furnished.

## 7. Transit Liability

Delivery is at the purchaser's risk. The risk shall pass to the purchaser as soon as the goods have left the factory. (Transportation insurance – see sect. 3 para 2.)

## 8. Notice of Defects

The purchaser is obliged to examine the delivery item immediately upon receipt and to report to us in writing any apparent defects or other complaints with respect to incomplete or incorrect delivery at the latest within 10 working days after receipt of goods. Defects or shortcomings that are not apparent must be reported to us in writing within 10 days after discovery. If the purchaser neglects this obligation, he will forfeit all rights to warranty claims.

## 9. Warranty

Unless agreed otherwise, we warrant the perfect functioning of the measuring instruments supplied by us for a period according to the actual laws. This warranty does not cover defects due to fair wear and tear, improper use/treatment or changes/repairs of the delivery item carried out by the purchaser or a third party.

Ensuring compliance with the relevant design and safety standards (VDE, TÜV, occupational association, etc.) within the framework of the application of the items supplied by us is solely the responsibility of the purchaser.

If the item supplied by us proves to be defective or unable to function as assured, we are obliged to either supply a replacement within a reasonable period or rectify the fault. If the replacement delivery or the rectification are not satisfactory, the purchaser can choose to demand cancellation of the contract or a reduction in price.

If the delivery item does not possess the qualities assured, the purchaser may also demand damages due to non-fulfillment instead of contract cancellation or price reduction. However, compensation for consequential damage caused by a defect, such as loss of production or damage to machines in particular, is excluded, unless the assurance was specifically given to offer protection against such consequential damage caused by a defect as has occurred or unless we are responsible because of intent or gross negligence.

Freight charges for replacement parts are paid by the purchaser.

## 10. Guaranty

As far as WTW take over a guaranty for their products in the price list and/or in the order confirmation the following provisions shall apply:

Provided the customer's purchase invoice is submitted to WTW, WTW shall warrant that the functionality of the product during the guaranty period will not be affected or excluded by manufacturing defects. The guaranty period starts from the date of invoice.

In the event of abnormal handling or improper use or not allowed opening of the product any guaranty claim will be precluded. Excluded from the guaranty shall be tear and wear material as well as such components as are usually replaced in the course of regular maintenance (e.g. batteries).

In case of guaranty WTW will within short term restore the functionality of the affected product at their own expense and at their sole discretion either by repair of the item or delivery of a spare part. The concerned product shall be returned to WTW at customer's expense.

WTW under this guaranty does not assume any further liabilities (esp. no damage compensation.) especially to pay, WTW's warranty and liability for any deficiencies of their products under these general terms and conditions as well as under the applicable provisions by law shall not be affected by this guaranty.

## 11. Place of Fulfillment and Jurisdiction

In trade and commerce, Weilheim i. OB., Germany, is agreed as place of fulfillment for deliveries, performances and payments. Furthermore, Weilheim is also agreed as place of jurisdiction in trade and commerce. However, in the case of proceedings on our part against the purchaser we can also bring an action at the purchaser's place of business; in the case of proceedings involving bills of exchange this is also possible at the place of payment of the bill of exchange. The legal relations between us and the purchaser are regulated exclusively by the substantive law of the Federal Republic of Germany. Any partial nullity of the above stipulations does not entail total nullity.

## 12. Declaration of Discontinuance

The Buyer undertakes to refrain from the following transactions under all circumstances:

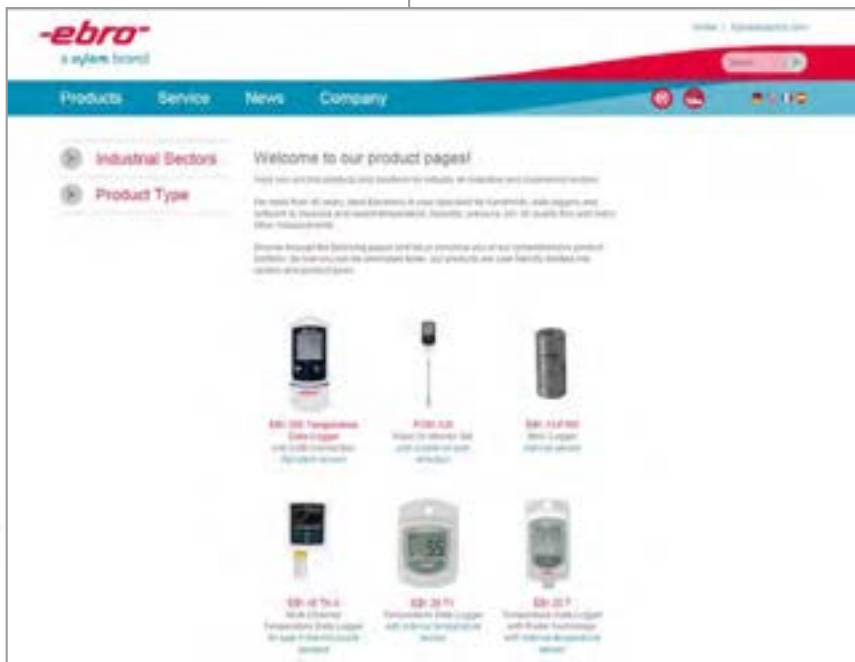
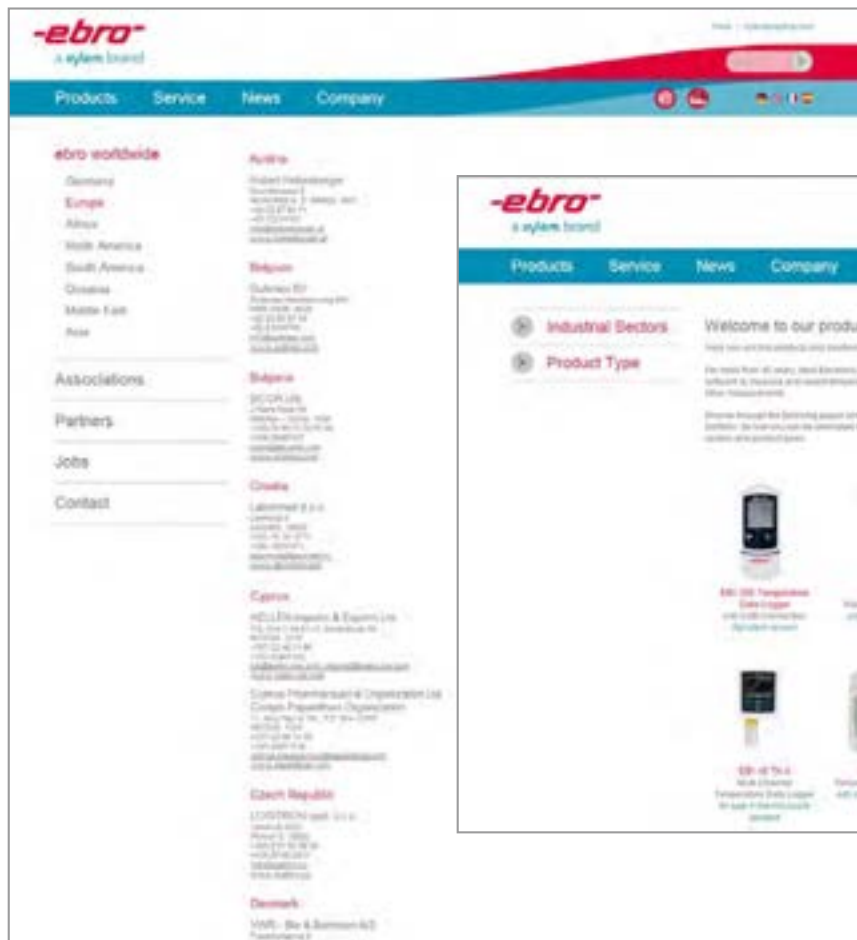
- Transactions involving persons, organizations or institutions listed on an applicable sanction list under EC / EU Regulations or U.S. export control and sanctions law, regulations or executive orders.
- Prohibited transactions involving embargoed countries.
- Transactions without the necessary authorization, in particular export authorization.

The Buyer shall be liable for all expenditure and loss incurred by the Seller as a result of any violation.

## 13. General

All conditions not covered by this document shall be as generally accepted by the Electrotechnical Industry.

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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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Company:

\_\_\_\_\_ Zip Code, City

\_\_\_\_\_ Name of person ordering / Dept. Phone

\_\_\_\_\_ Street Fax

\_\_\_\_\_ Date Signature

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1020-3688	166	1340-5433	100	1340-6109	10	1341-0026	65	1341-6331	19		
1020-3690	166	1340-5434	100	1340-6111	11	1341-0027	65	1341-6332	77		
1020-3693	166	1340-5437	98	1340-6112	11	1341-0028	65	1341-6332-0001	77		
1020-3699	166	1340-5438	98	1340-6129	11	1341-0400	127	1341-6333	77		
1100-0106	99	1340-5439	98	1340-6130	12	1341-0400-EX	95	1341-6335	78		
1100-0106	102	1340-5460	104	1340-6134	12	1341-0406	127	1341-6336	75		
1100-0106	109	1340-5462	105	1340-6135	13	1341-0406-EX	95	1341-6337	78		
1100-0117	21	1340-5464	105	1340-6142	16	1341-0409	127	1341-6338	79		
1100-0117	33	1340-5510	102	1340-6143	17	1341-0409-EX	95	1341-6339	79		
1100-0118	21	1340-5516	102	1340-6144	12	1341-0412	127	1341-6340	79		
1100-0118	33	1340-5520	107	1340-6145	13	1341-0412-EX	95	1341-6341	79		
1100-0120	41	1340-5521-EX	93	1340-6146	16	1341-0414	127	1341-6342	79		
1100-0121	67	1340-5522	107	1340-6147	17	1341-0414-EX	95	1341-6343	79		
1100-0125	41	1340-5530	107	1340-6148	16	1341-0415	127	1341-6344	79		
1100-0126	77	1340-5531-EX	93	1340-6152	18	1341-0415-EX	95	1341-6370	75		
1300-0250	153	1340-5532	108	1340-6153	15	1341-0607	127	1342-0200	127		
1300-0255	153	1340-5610	140	1340-6154	14	1341-0607-EX	95	1342-0300	127		
1300-0260	153	1340-5621	140	1340-6155	17	1341-0608	124	1342-0400	127		
1339-0620	150	1340-5625	19	1340-6156	17	1341-0609	127	1343-0400	127		
1339-0629	151	1340-5625	65	1340-6161	15	1341-0609-EX	95	1343-0403	127		
1339-0631	151	1340-5625	75	1340-6162	16	1341-0611	127	1343-0415	127		
1339-0632	151	1340-5625	78	1340-6164	15	1341-0611-EX	95	1343-0607	127		
1339-0660	48	1340-5625	141	1340-6165-EX	18	1341-0619	99	1343-0609	127		
1339-0660	148	1340-5625	143	1340-6166-EX	18	1341-0619	109	1343-0635	131		
1339-0661	48	1340-5626	65	1340-6171	19	1341-0624	115	1343-0639	134		
1339-0661	148	1340-5626	75	1340-6193	21	1341-0635	131	1343-0640	132		
1339-0662	148	1340-5626	78	1340-6197	25	1341-0639	134	1343-0641	132		
1339-0663	148	1340-5626	141	1340-6198	25	1341-0640	132	1343-0644	132		
1340-0006	41	1340-5626	143	1340-6198	52	1341-0641	132	1343-0646	136		
1340-0025	65	1340-5627	65	1340-6200	64	1341-0644	132	1343-0652	133		
1340-0157	105	1340-5627	75	1340-6201	64	1341-0645	132	1343-0653	131		
1340-0595	102	1340-5627	78	1340-6202	65	1341-0646	136	1343-0654	131		
1340-0595	109	1340-5627	141	1340-6204	65	1341-0646-EX	95	1343-0664	137		
1340-0595	157	1340-5627	143	1340-6210	67	1341-0652	133	1343-0674	137		
1340-0595	160	1340-5650	156	1340-6211	67	1341-0653	131	1343-0678	135		
1340-0596	102	1340-5651	156	1340-6215	67	1341-0654	131	1343-0702	129		
1340-0596	109	1340-5652	156	1340-6220	67	1341-0664	137	1343-0710	128		
1340-0596	157	1340-5653	156	1340-6221	67	1341-0674	137	1343-0712	130		
1340-0596	160	1340-5654	156	1340-6270	39	1341-0702	129	1343-0717	129		
1340-1570	160	1340-5655	156	1340-6271	39	1341-0710	128	1343-0720	128		
1340-1594	160	1340-5656	156	1340-6272	39	1341-0712	130	1343-0721	130		
1340-1611	111	1340-5657	156	1340-6290	39	1341-0717	129	1343-0800	136		
1340-1620	114	1340-5658	156	1340-6291	39	1341-0720	128	1343-0810	127		
1340-1753	119	1340-5660	156	1340-6292	39	1341-0721	130	1343-0814	127		
1340-1754	119	1340-5661	156	1340-6293	39	1341-0800	136	1343-0845	133		
1340-1783	118	1340-5664	156	1340-6295	38	1341-0805	127	1343-0927	135		
1340-1786	118	1340-5667	156	1340-6296	38	1341-0805-EX	95	1343-1000	125		
1340-1790	120	1340-5668	156	1340-6297	38	1341-0810	127	1343-1005	124		
1340-1790	141	1340-5730	114	1340-6298	41	1341-0810-EX	95	1343-1015	125		
1340-1892	21	1340-5730	120	1340-6299	41	1341-0812	127	1343-2626	69		
1340-1894	21	1340-5735	115	1340-6330	74	1341-0812-EX	95	1343-2626	109		
1340-1961	33	1340-5800	149	1340-6331	76	1341-0814	127	1343-2626	123		
1340-1963	33	1340-5810	150	1340-6332	73	1341-0814-EX	95	1343-2627	69		
1340-1984	33	1340-5812	48	1340-6333	73	1341-0845	133	1343-2627	109		
1340-1988	33	1340-5812	146	1340-6334	75	1341-0927	135	1343-2627	109		
1340-2005	33	1340-5813	146	1340-6335	75	1341-1000	125	1343-2627	118		
1340-2286	83	1340-5814	146	1340-6336	78	1341-1005	124	1343-2627	118		
1340-2287	87	1340-5831	149	1340-6337	77	1341-1015	125	1343-2627	123		

# Our Services for You

At ebro service is more than just a word – ebro offers solutions according to customer wishes.

## Service and Calibrations

We are happy to perform your calibration for temperature, pressure and relative humidity in our accredited DKD laboratory for you. Please just contact us.

## Competence Centre ebro Electronic

### Seminar program 2016

Demands for solid technical Know How transfer are permanently increasing and therefore the requests for training and special workshops are on the rise.

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Theory and practice combined are the key to our successful transfer. Our moderators/presenters are all experts in their own fields. The aim is to achieve an in-depth understanding of hardware and software alike.

If you feel that you prefer an In-House seminar in your own facilities we are open to discussions and flexible to offer you a customized training program to match your demands. Please feel free in contacting us to tell us about your desired time schedule, what the training course should cover and how many participants will attend. We will gladly send you an offer.

You can find the current program on our homepage [www.ebro.com](http://www.ebro.com).

## IQ / OQ Documentation

Of course, you will receive an IQ / OQ documentation of the system according to the GAMP guidelines.



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